Annual Institute for Building Officials

# Advantages of Concrete for Low- and Mid-Rise Construction

**Donn C. Thompson AIA, LEED AP BD+C**
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**Chad Regnier**
President Concrete, Inc.

BUILD WITH STRENGTH MINNESOTA

CI CONCRETE, INC.

**January 12, 2021**

# These are all Concrete

BUILD WITH STRENGTH
A COALITION OF THE NATIONAL READY MIXED CONCRETE ASSOCIATION

**Multi-family**




**Commercial**




**Schools**




# ICF Components

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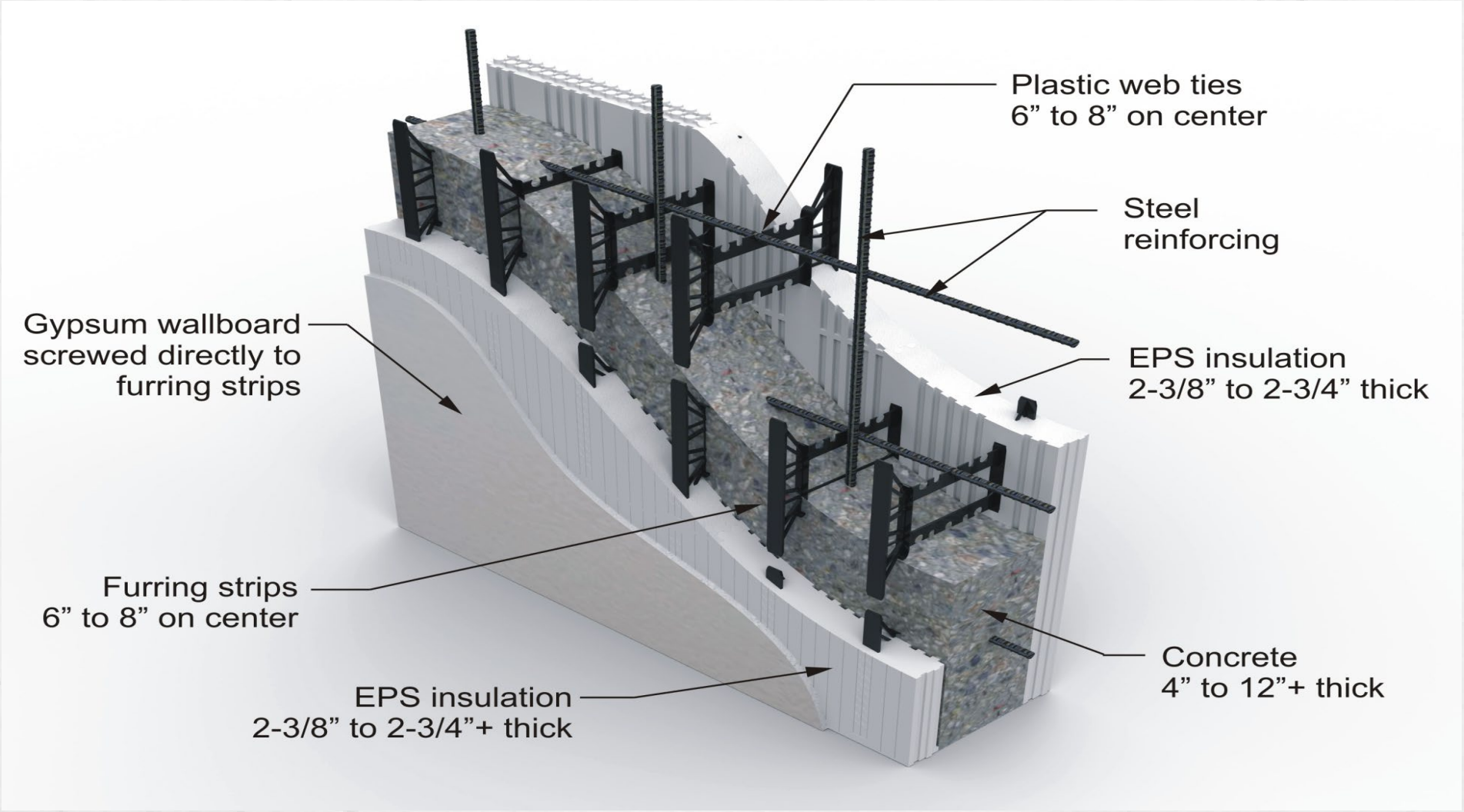

# Insulated Concrete Forms (ICF) - Walls

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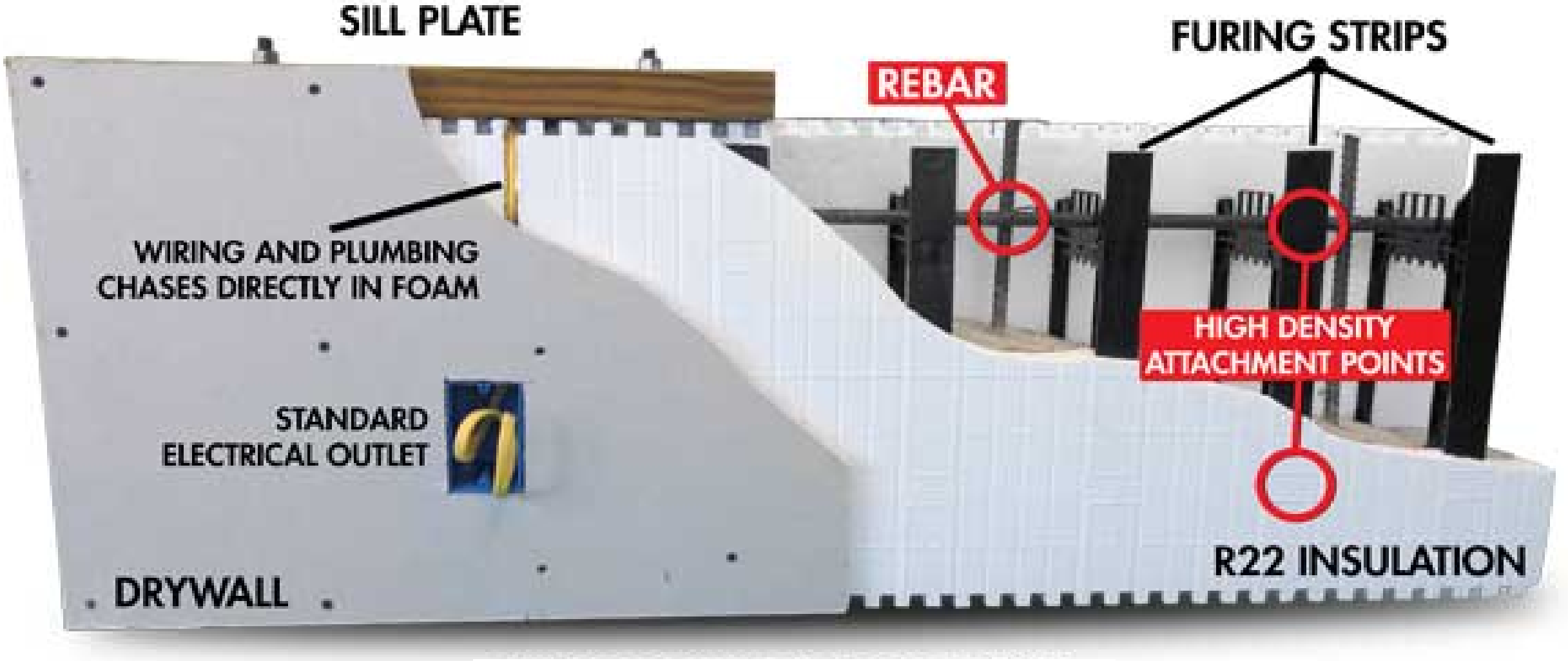
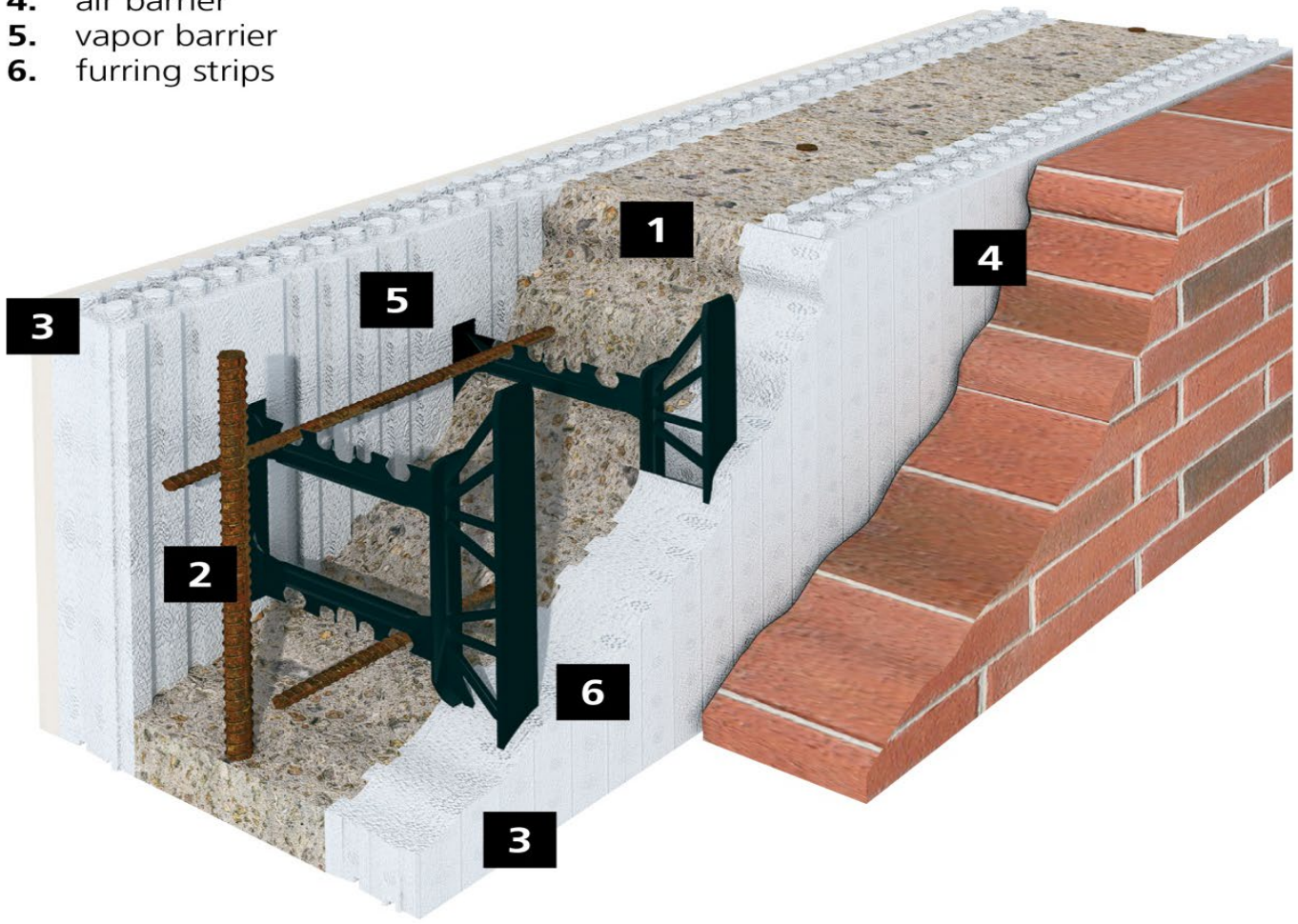


# Less Complicated Exterior Wall

1. concrete
2. steel reinforcement
3. insulation
4. air barrier
5. vapor barrier
6. furring strips

## 6 in 1 Assembly



# 6 Easy Steps…

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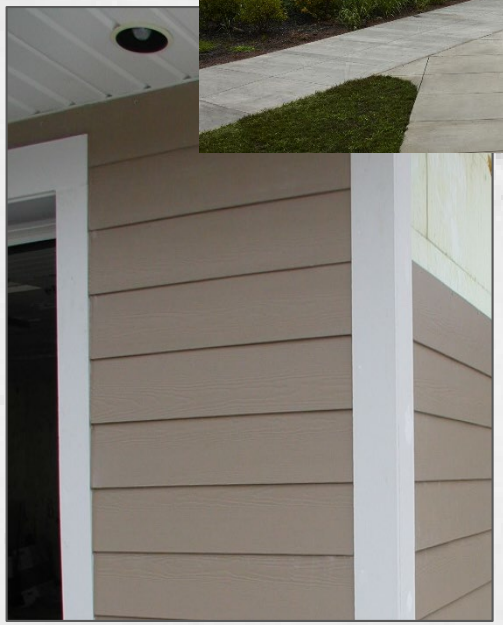
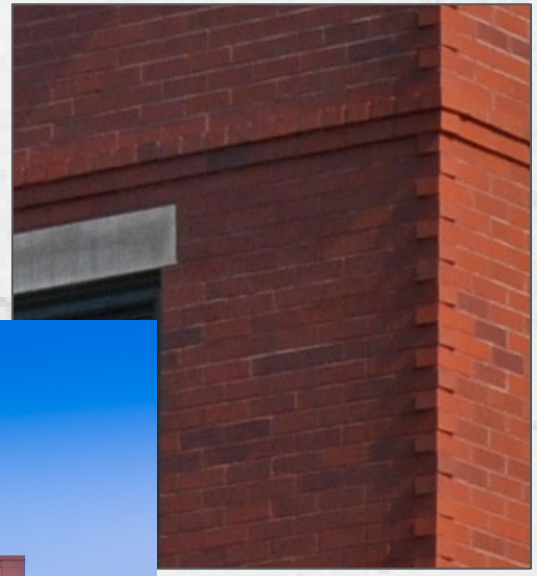
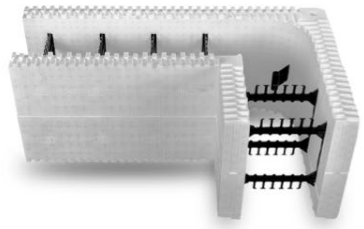
# Any Finish



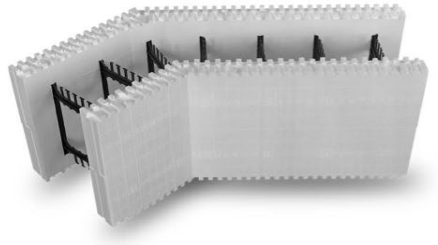



# Versatile

Straight Block

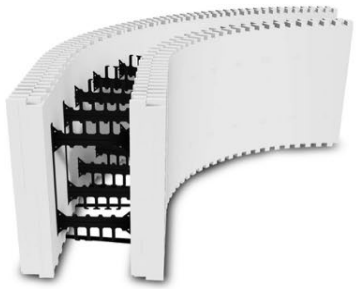


Corner Block



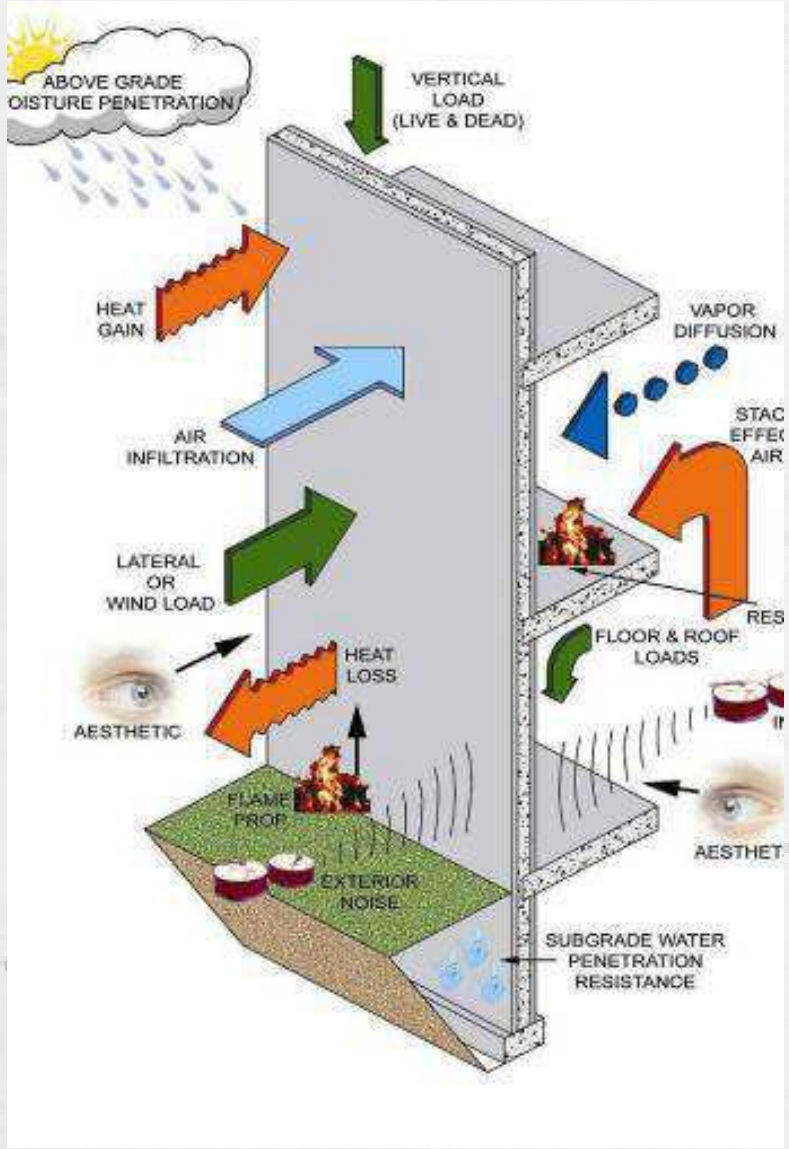
45 Degree Corner

ICF Brick Ledge



ICF Radius Blocks

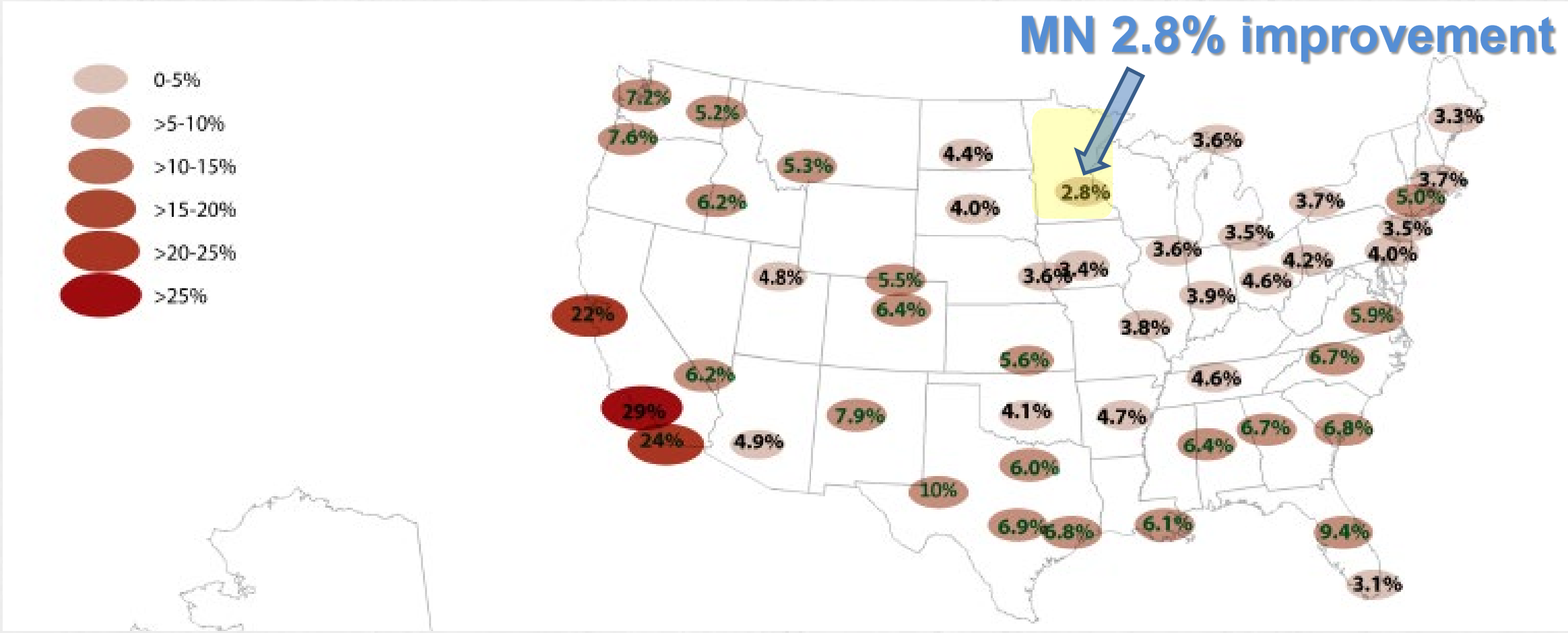
# Envelope Performance: ICF




## ICF Advantages

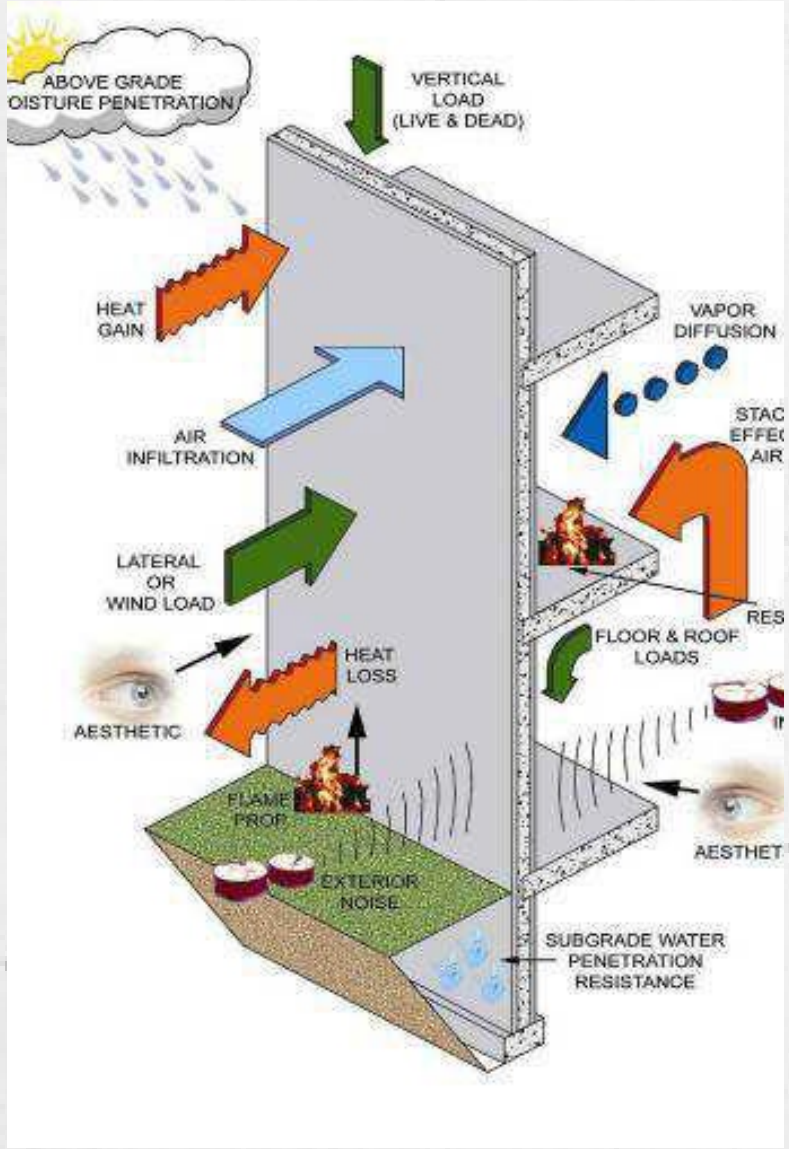
- **6 in 1 Full Assembly = efficiencies**
- **Fewer Building Site Materials** & Fewer Sub-Trades to schedule
- **Speed of Construction**
- **Superior Strength** & Building Security
- Design Flexibility
- Superior **Thermal** Performance
  - **High R-Value**
  - **Low Air Infiltration**
  - **Thermal Mass**

# Envelope Performance: Thermal Mass




Source: Mapping Thermal Mass Benefit, MIT Concrete Sustainability Hub

# Envelope Performance: ICF



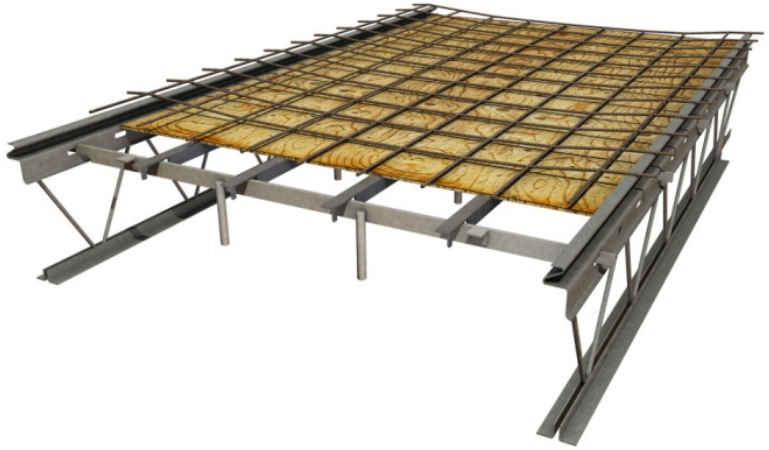

## ICF Advantages

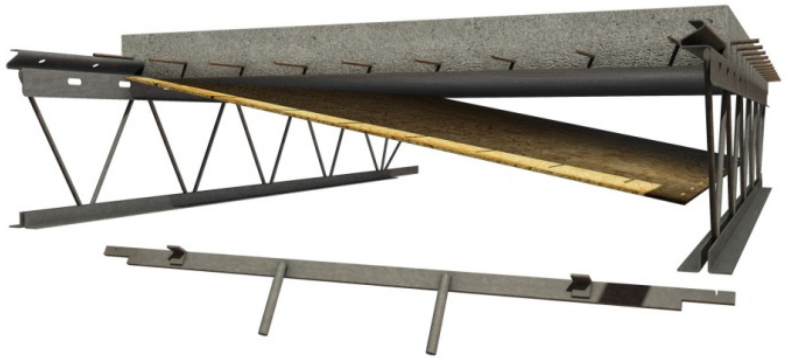
- **Reduction** of Building HVAC & Annual **Maintenance Costs**
- Healthy Indoor Environmental Air Quality **IAQ**
- Provides Sound Suppression (High **STC** Rating)
- Compatible with a variety of **Finish Materials**
- **Sustainable Products** – Green Building Performance
- **USGBC LEED** or other Green Building Program “Contributor or Enhancer”

# Hollow Core

Courtesy of Oldcastle

# Steel Joist – Wood Forms





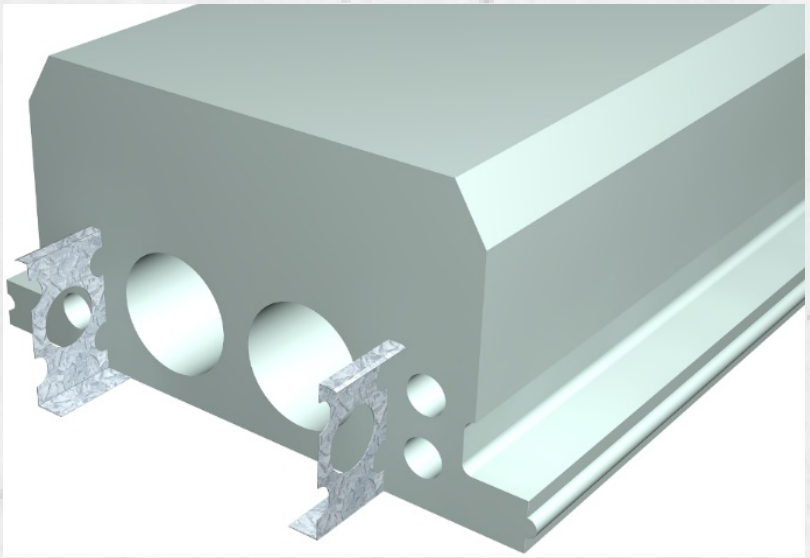
# Steel Joists – Metal Deck

# Cold Formed Steel

Courtesy of iSpan

# Insulating Concrete Floors

# Insulating Concrete Floors



# Concrete Talking Points

BUILD WITH STRENGTH
A COALITION OF THE NATIONAL READY MIXED CONCRETE ASSOCIATION

## Advantages for Load Bearing Mid-rise

- Safer and Easier to Use
- Fewer Trades – Saves Money
- Flexible – Easily receives any finish and all building systems
- Quiet – Happy Owners Save you Money
- Energy Efficient – Saves Money
- Resilient and Non-Combustible
- Sustainable – USE-PHASE & EMBODIED CARBON is DRAMATICALLY REDUCED
- Very Competitive on First Cost
- Fast – Saving Time Saves you Money
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- A Higher Quality Asset with Lower Cost of Ownership
- Well Established - 1000's of buildings nationally

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# Speed and Safety

BUILD WITH STRENGTH
A COALITION OF THE NATIONAL READY MIXED CONCRETE ASSOCIATION

- Build through winter
- Place floor slabs 3 days after a wall is placed
- Finishes can be formed or attached directly to interior and exterior of forms
- Install windows while superstructure is being built
- Fewer Trades = Safer Job
- Warmer work environment in winter
- Cooler work environment in summer

A FASTER PROCESS

## Fewer Trades

- Same crew can install exterior wall system, interior walls, floors, windows & roof deck.

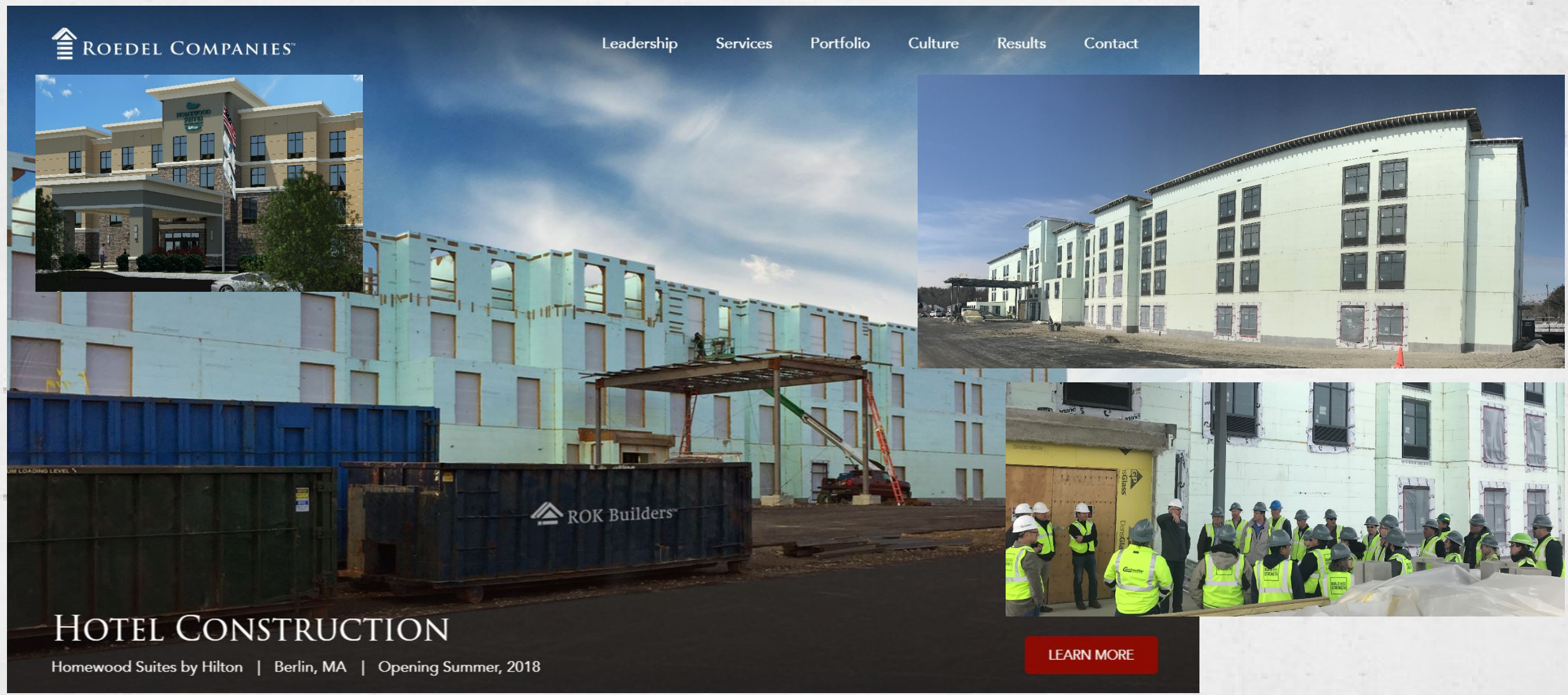
# Speed and Safety

BUILD WITH STRENGTH
A COALITION OF THE NATIONAL READY MIXED CONCRETE ASSOCIATION

- *"There are no aspects of the ICF system that pose a safety risk any higher than any other form of construction. If anything the risks are less. Concrete truck traffic and overhead concrete pumping are typical. The sub-contractor had a wall brace/scaffold system for the walls up to 10 feet which included a railing system to meet fall protection requirements. For the main gym walls extending nearly 36 feet they utilized a Safeway scaffold system which included on-site training for all."* – Bryan Koenig, Shingobee Builders

# ICF hotels

BUILD WITH STRENGTH
A COALITION OF THE NATIONAL READY MIXED CONCRETE ASSOCIATION



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# The Client Experience

- Walls
  - STC: 55-70
- Floor
  - STC: 50+
  - IIC: 50+

# Noise Costs Money

Every Multi-Family Operator will tell you:

Annual apartment unit turnover ~30-50%

11% of those tenants vacate due to noise

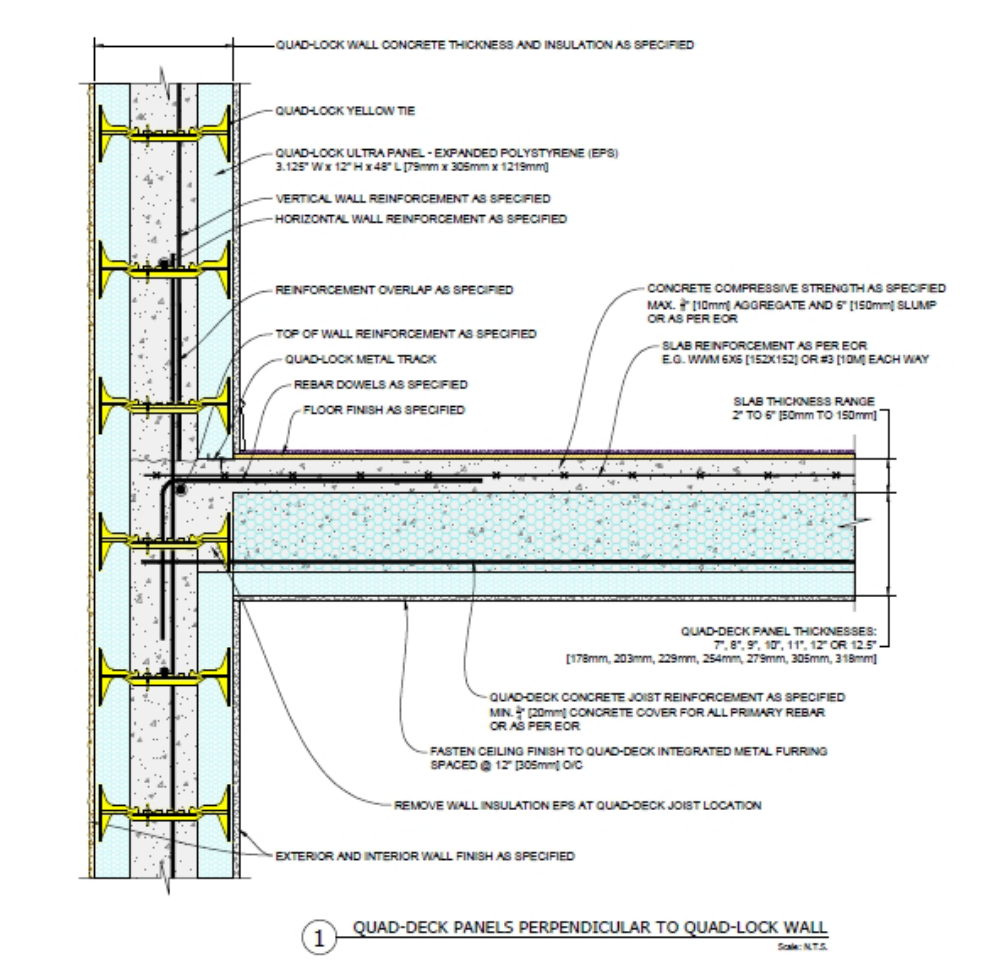
Cost to turn each unit is $3000

80,000 units x 40% = 32,000

32,000 X $3000 = $96 million

$96 million X 11% = $10.5 million

**Noise Costs $10 million/year**



# Net Zero ICF schools started in Kentucky

- Nation's First Net Zero Energy School
- 77,466 SF
- 550 students
- ICF, geothermal, daylighting, PV
- Warren County Schools has yet to receive a single utility bill for this project!

Forbes

Peter Kelly-Detwiler, Contributor
I write about energy technologies and policies.

ENERGY | 12/10/2012 @ 8:05AM | 2,395 views

## Net Zero Schools in Kentucky: Models for the Future Come from Surprising Places

This week, I asked a close friend to guess which state boasted the nation's first net zero public elementary school. "California?" he ventured. "Vermont?" "Massachusetts?" No, no, and no. How about Kentucky, the nation's third largest coal producer, with $5 bn in annual coal revenues and the nation's fourth lowest electricity costs (at just over 7 cents per kilowatt-hour)?

(Richardsville School - Architect: Sherman Carter Barnhart Architects; photo courtesy of CMTA, Inc.)

Almost everybody thinks about ambitious energy policy as coming from the right or left coasts, where avoided costs are higher and environmental fervor is often stronger. You only have to look at the location of Prius ownership to see that bias reflected. But if you have been paying attention to the Kentucky Governor Steve Beshear's energy plan, "Intelligent Energy Choices for Kentucky's Future," you might have guessed that the first net zero elementary school would be claimed by the Bluegrass State. It is a very ambitious strategy, and includes seven specific goals to be reached by the year 2025:

1) improve energy efficiency to meet 18% of 2025 demand
2) increase renewables three-fold to 1000 MW
3) develop biofuels to supply 12% of vehicle fuels consumed
4) develop a coal-to-liquid capability that can convert 50 mm tons of coal to 4 billion gallons of liquid fuel by 2025
5) increase gas supplies (including coal to gas) to supply 100% of natural gas requirements
6) insert carbon management technologies in 50% of
7) evaluate the use of nuclear
energy future

# Energy Utilization Index

- EUI is expressed as energy per square foot per year
- It's calculated by dividing the total energy consumed by the building in one year (measured in kBtu or GJ) by the total gross floor area of the building.
- Generally, a low EUI signifies good energy performance

# Reducing EUI

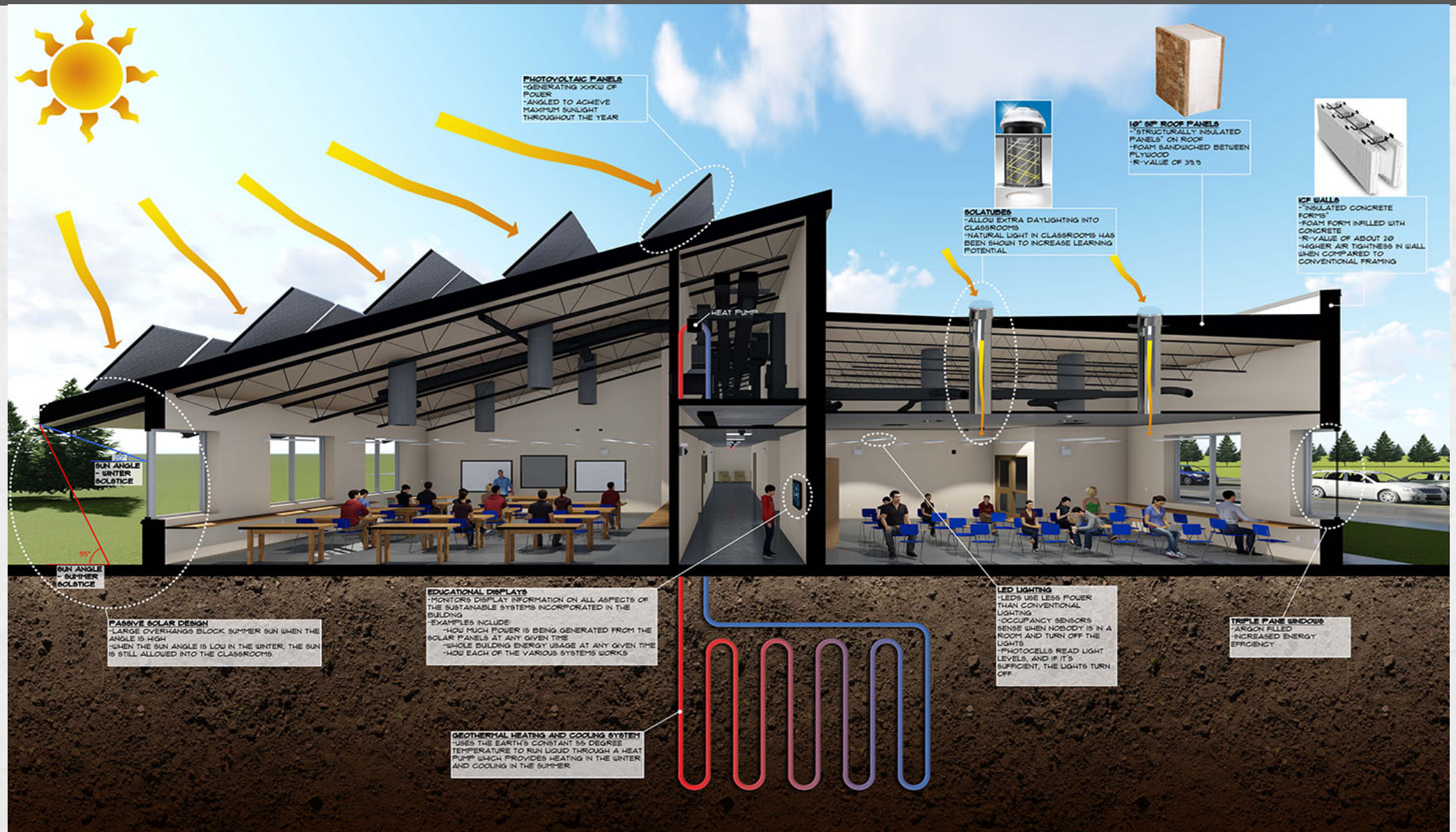
- Ensuring proper maintenance of equipment to improve efficiency
- Installing motion activated lights (occupancy sensors)
- Incorporate the use of natural sunlight into the design of occupied spaces
- Provide a means for passive heating and cooling of interior spaces
- Develop on-site renewable energy generation
- Heating, air conditioning, and lighting in building spaces together comprise the majority of energy use and obtaining efficiencies in these two areas can result in a significant amount of cost savings, as well as gains in compliance with the 2030 energy reduction goals.

# Four Winds Net Zero School Fort Totten, ND

The country's first Tribal Net Zero school for the Four Winds School District on the Spirit Lake Sioux Reservation in Fort Totten, North Dakota.

# Four Winds Net Zero School

Fort Totten, ND



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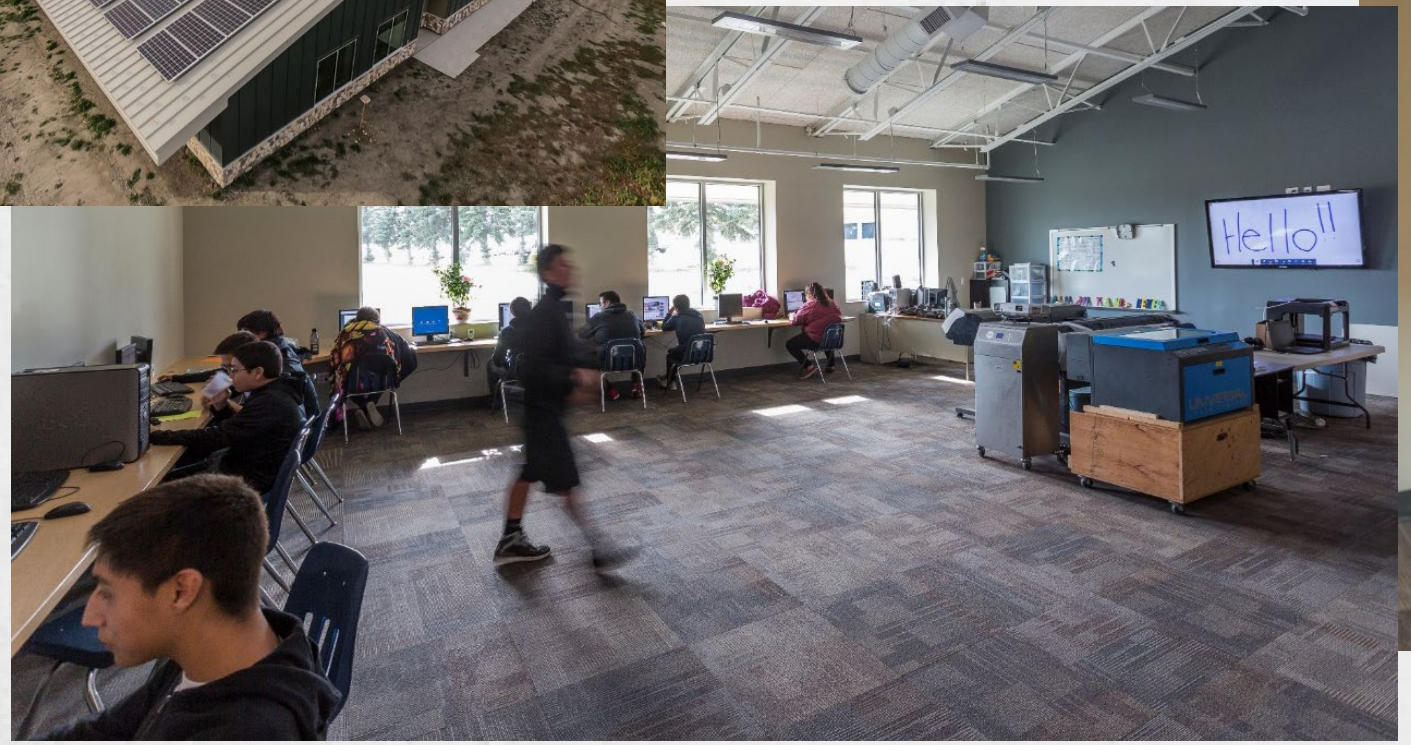


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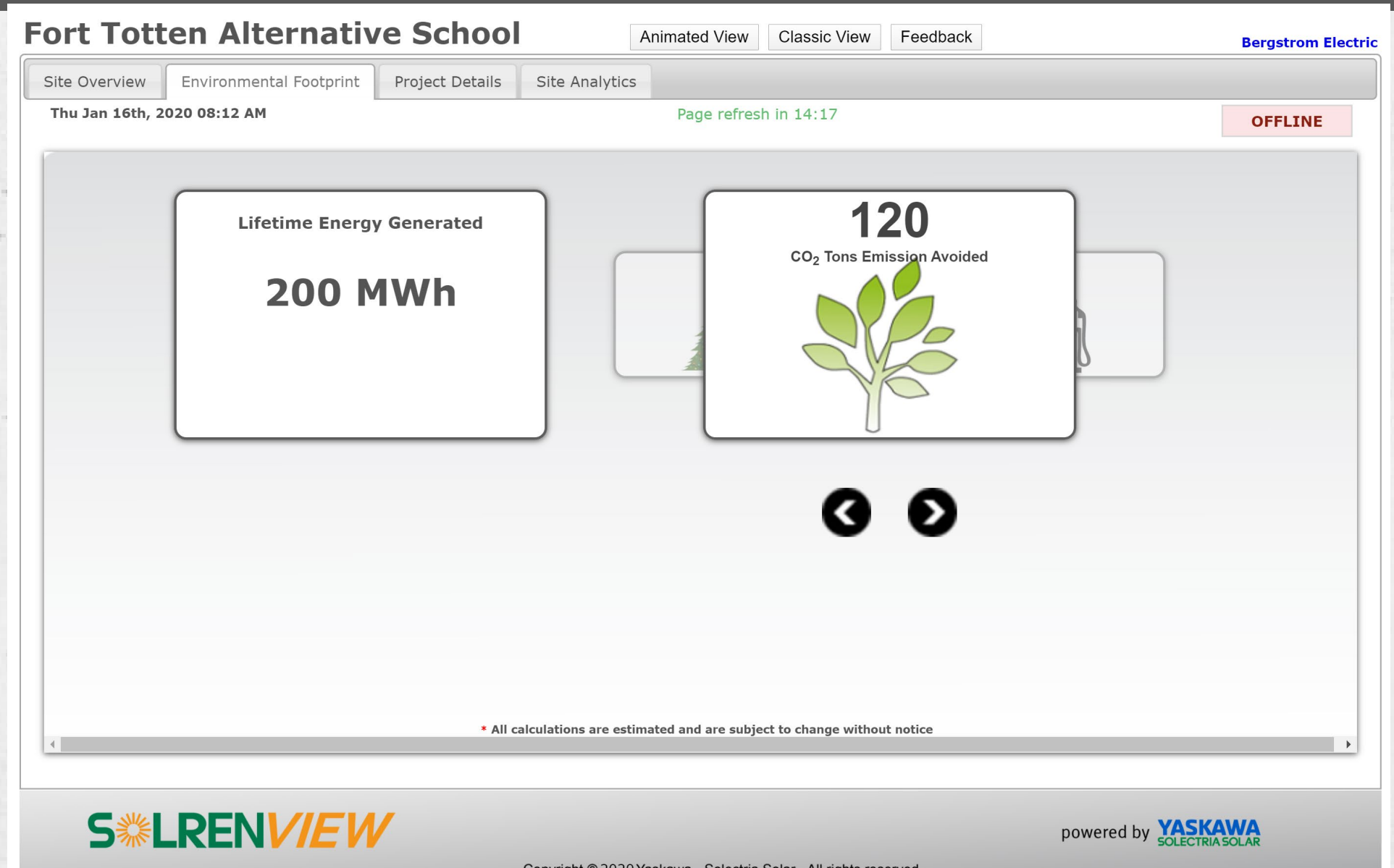

# Four Winds Net Zero School Fort Totten, ND

## Fort Totten Alternative School

Animated View | Classic View | Feedback

Bergstrom Electric

Site Overview | Environmental Footprint | Project Details | Site Analytics

Thu Jan 16th, 2020 08:12 AM

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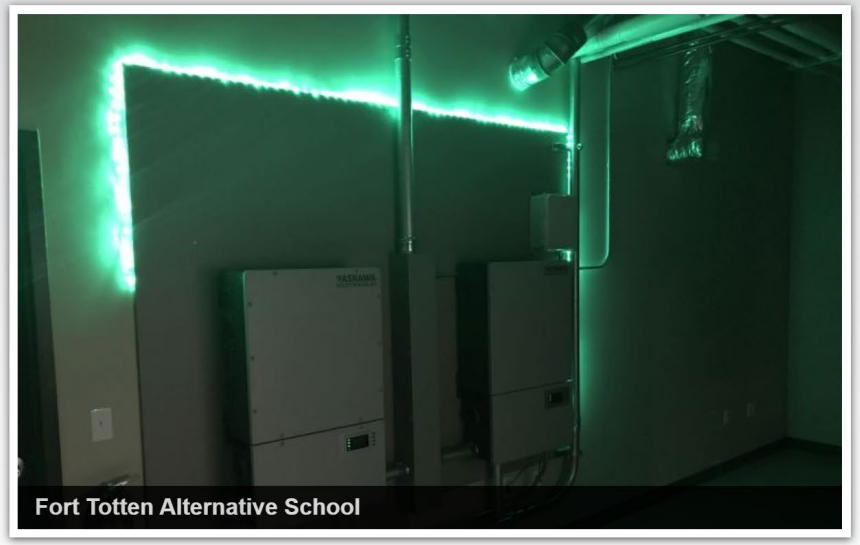
OFFLINE

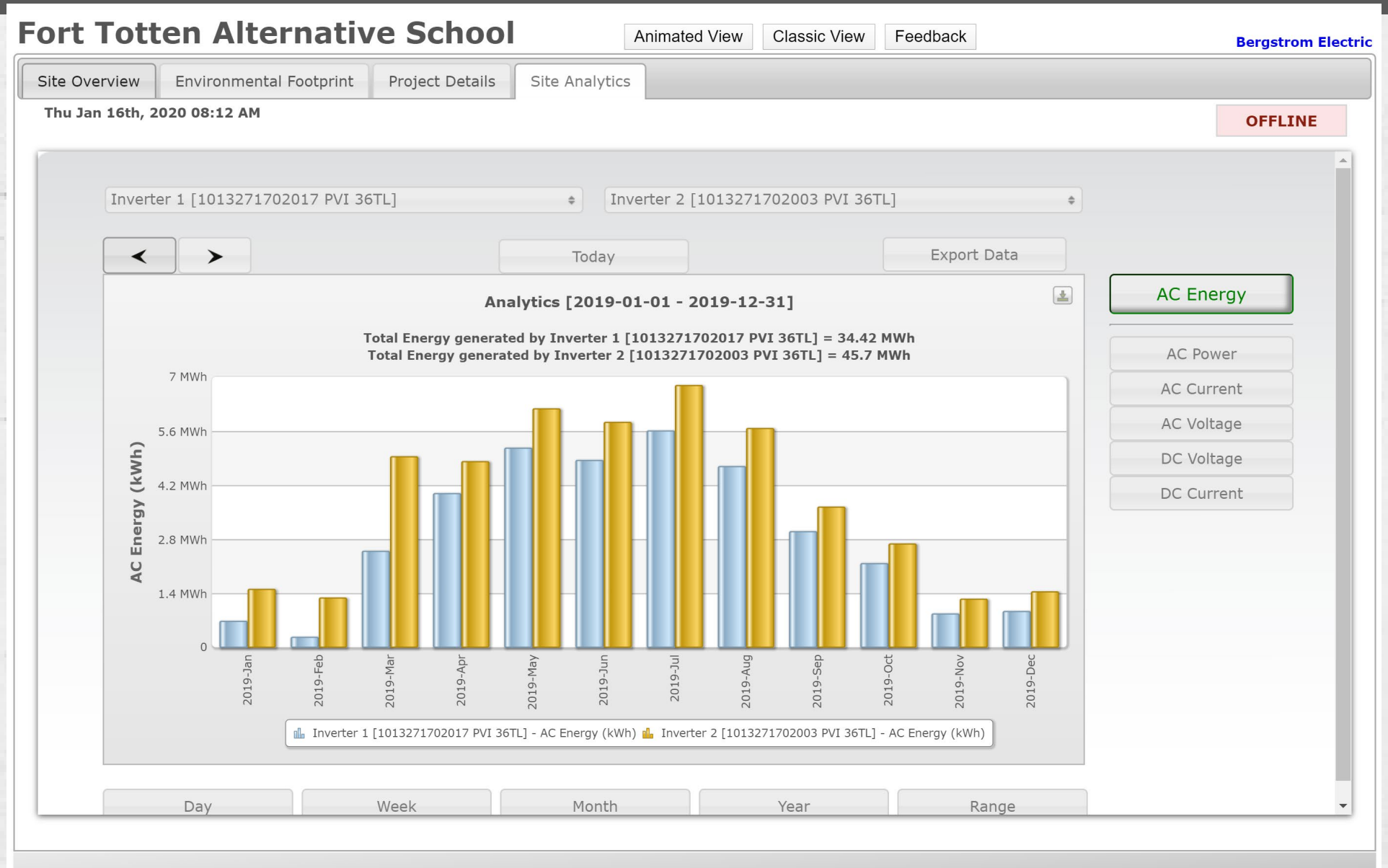



| | |
|---|---|
| System Size | 80.07 kWdc |
| Location | 7268 Hwy 57<br>Fort Totten, ND 58335 US |
| Inverters | 2 Solectria PVI 36TL |
| Modules | 239 x Solarworld 335 |

SOLRENVIEW

powered by YASKAWA SOLECTRIA SOLAR

# Four Winds Net Zero School Fort Totten, ND



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MICHAEL – Mexico Beach, FL 2018
KATRINA – Mississippi 2005

# F2 Tornado


BUILD WITH STRENGTH
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## Iowa tornado hits speeds of 110 mph as it rips through Johnson County

Tyler J. Davis and Aaron Calvin, The Des Moines Register  Published 7:22 p.m. CT May 24, 2019 | Updated 3:27 p.m. CT May 25, 2019


the job network
Keywords (ex. registered nurse)
Des Moines, IA
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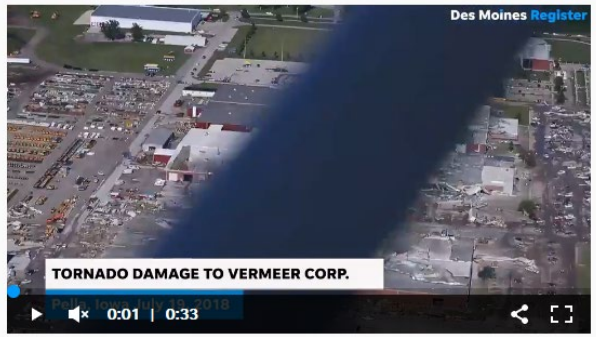
## 'Sudden' tornadoes slam central Iowa, ripping through Vermeer plant and tearing chunks off buildings in Marshalltown and Bondurant

Kathy A. Bolten, The Des Moines Register  Published 9:09 p.m. CT July 19, 2018 | Updated 11:34 p.m. CT July 19, 2018

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Keywords (ex. registered nurse)
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**JULY 2017 – STEVENSVILLE, MARYLAND**


CONCRETE
DESIGN
CENTER
WE CAN HELP YOU BUILD FOR A LIFETIME.
BUILD WITH STRENGTH
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SKYTRAK
6042


Chesapeake Village Center in Stevensville has become the first building in the state to earn Emerald certification from the National Green Building Standard


Portsmouth Fire Department
STATION 2
CASE STUDY: ICF
CHARLOTTE-MECKLENBURG POLICE DEPARTMENT
3505 Central Avenue, Charlotte, NC 28205
Project Size: 12,600 square feet
Project Cost: $3.2 million
Contractor: Southside Constructors, Inc.
ICF Installer: Cobra Concrete
THE CORNERSTONE OF A COMMUNITY
The Charlotte-Mecklenburg Police Department deserves a facility as dependable and strong as the men and women who work there. That's why the city chose concrete as a major component in its newly-constructed headquarters. The sturdy and sustainable design has insulated concrete forms, or ICFs, to thank for its fast construction and energy efficiency. Charlotte and Mecklenburg County now have a community focal point demonstrating strength and unity.
01. Focal points must functionality
The columns at the front of the police department aren't just pleasing to the eye. The 18-foot tall walls and ICF columns provide a sturdy foundation for the structure.
02. Reduced energy usage
Thanks in part to the thermal properties of ICFs, the new building has seen a 60 percent reduction in energy use and is LEED Gold Certified.
03. Serious time saver
"I can't wait for my next opportunity to build with ICFs. The ICF system easily saved us over a month off our construction time," said Allen Burris of Southside Constructors.
04. Green construction
Nearly 85 percent of construction waste was recycled. Just another green benefit of building with concrete – it can be recycled into aggregate.
BUILD WITH STRENGTH


The least safe building you can legally build.
Fire kills more Americans than all natural disasters combined.

# Concrete is Safer

BUILD WITH STRENGTH
A COALITION OF THE NATIONAL READY MIXED CONCRETE ASSOCIATION

- Walls (Fire Ratings)
  - 2 hrs for 4” wall
  - 3 hrs for 6” wall
  - 4 hrs for 8” wall
- Floors (Fire Ratings)
  - 2 to 3 hrs
  - Depends on system

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# The Challenge

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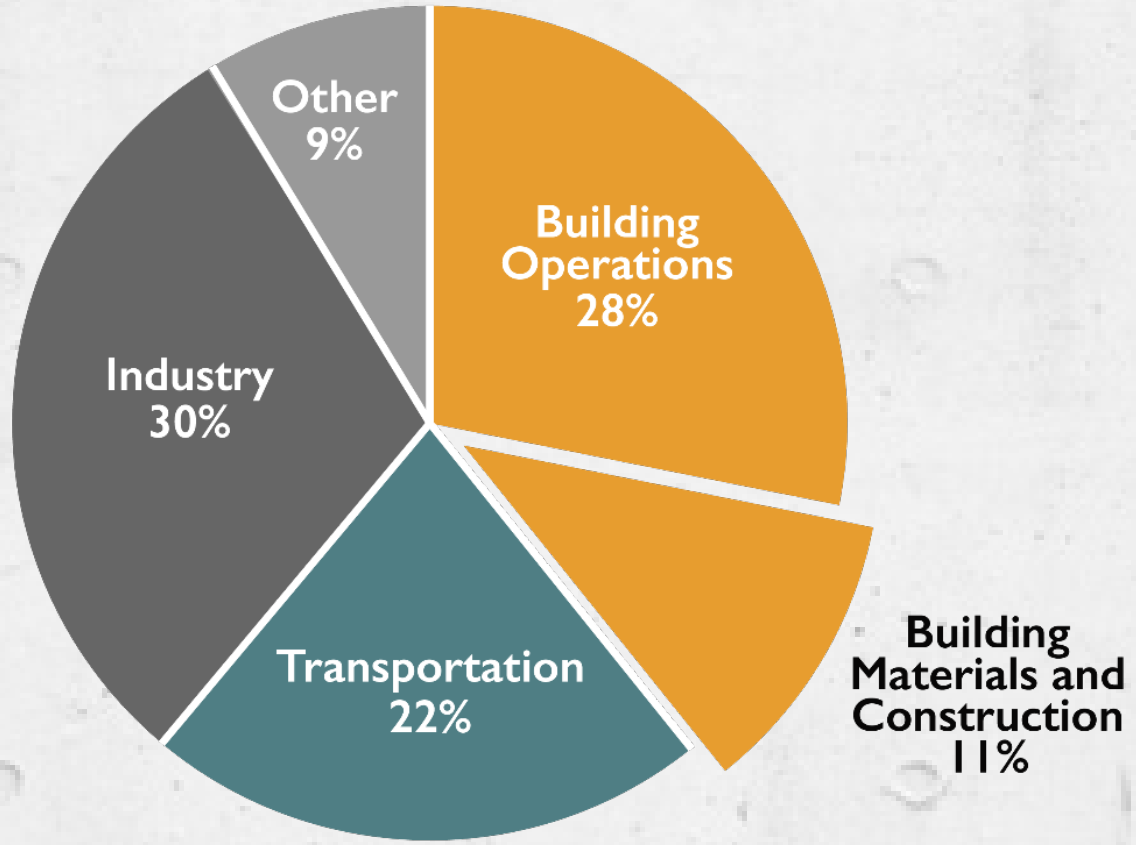
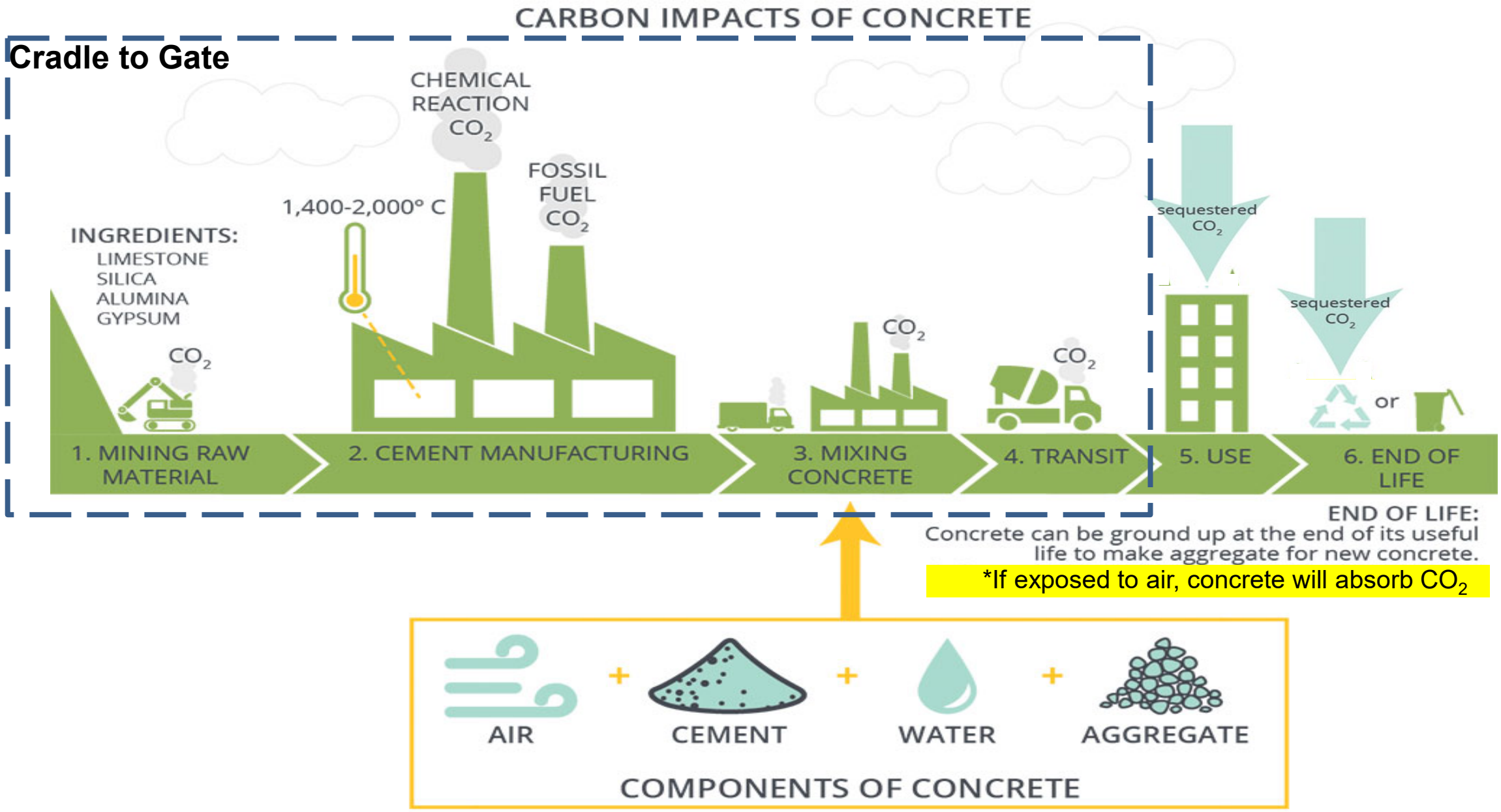
## Annual Global $CO_2$ Emissions



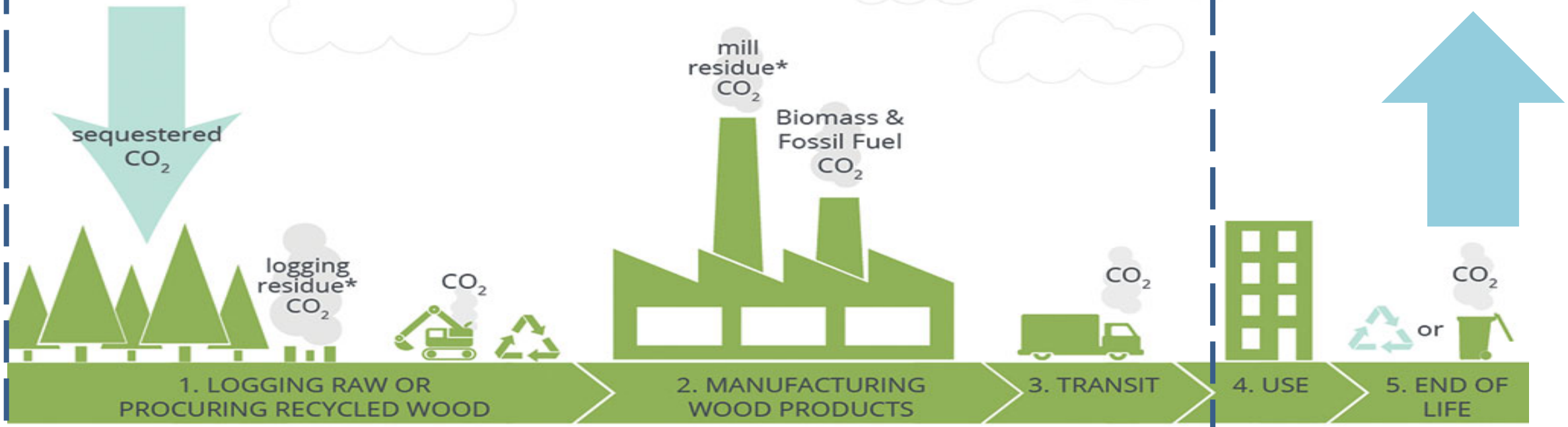

Source: UN Environment Global Status Report 2017
Data Source: IEA (2017), World Energy Statistics and Balances

architecture 2030



# CARBON IMPACTS OF WOOD

**Cradle to Gate**




**END OF LIFE:**

Most wood products are disposed of at the end of the building's life, at which point any stored $CO_2$ is released through decomposition.

Some wood members can be recycled or reused.

* **logging residue** = branches, stumps that get left behind, releasing $C0_2$
* **mill residue** = Wood and bark residues produced in processing logs into lumber and plywood, releasing $C0_2$

# The Solutions?

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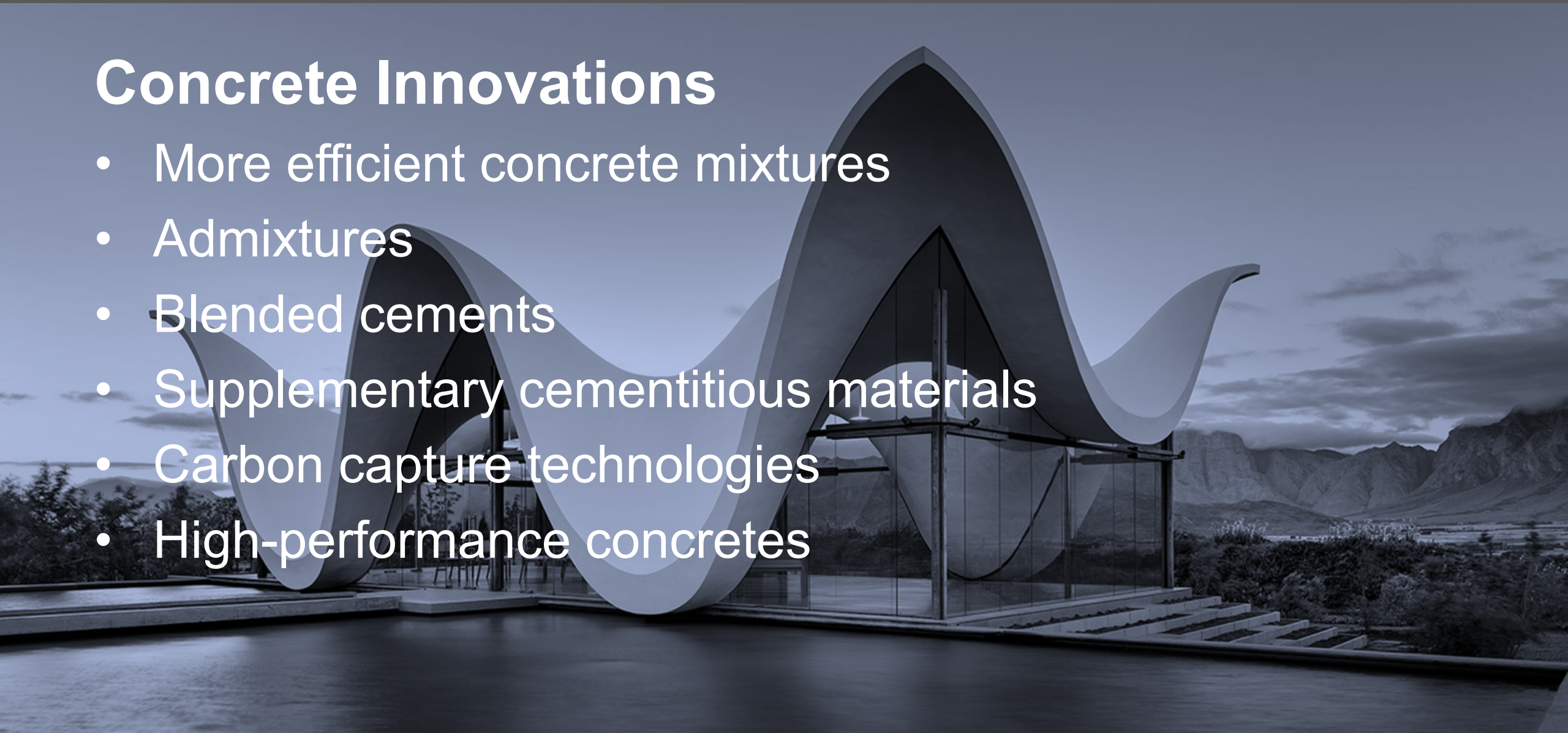


## Concrete Innovations

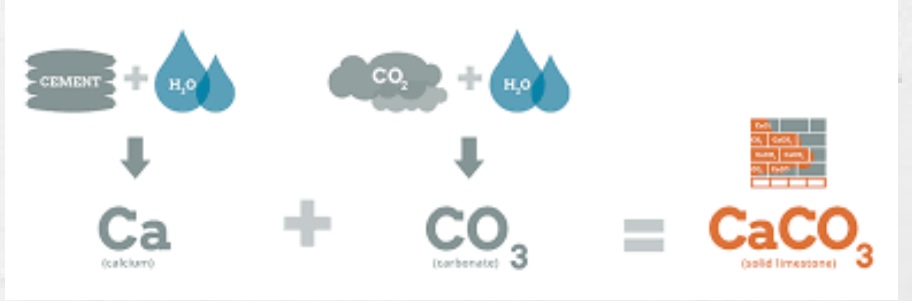
- More efficient concrete mixtures
- Admixtures
- Blended cements
- Supplementary cementitious materials
- Carbon capture technologies
- High-performance concretes

# Carbon Capture

- Carbonation: carbon dioxide ($CO_2$) penetrates the surface of hardened concrete and chemically reacts with cement hydration products to form carbonates
- $CO_2$ uptake are greatest when the surface-to-volume ratio is high
- When concrete has been crushed and exposed to air.
- Article “Substantial Global Carbon Uptake by Cement Carbonation,” Nature Geoscience
  - Estimates cumulative $CO_2$ sequestered in concrete is 4.5 Gt 1930-2013
  - 43% of the $CO_2$ emissions from production of cement
  - Carbonation of cement products represents a substantial carbon sink.

# Enhanced Carbonation

- Inject $CO_2$ into concrete
- Creates artificial limestone
- Sequesters small amount of $CO_2$
- Enhances compressive strength
- Reduces cement content




Courtesy of CarbonCure

# Case Study: 725 Ponce, Atlanta

- 360,000 square feet of office space
- 48,000 cubic yards of carbonated concrete
- Concrete sequestered 680 metric tons of $CO_2$
- The amount of $CO_2$ absorbed by 800 acres of U.S. forest in one year

Courtesy of CarbonCure

# Enhanced Carbonation

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- Combine industrial $CO_2$ emissions with metal oxides
- $CO_2$ absorbed construction aggregate (limestone)
- 44% by mass permanently eliminated $CO_2$
- Substrate is small rock particles or recycled concrete
- Carbon-negative concrete is achievable
  - 1 $yd^3$ of concrete contains 3,000 lbs. of aggregate
  - Roughly 1,320 lbs. of sequestered $CO_2$
  - Offsets considerably more than the amount of $CO_2$ generated during cement production (roughly 600 lbs. per $yd^3$)


Courtesy of Blue Planet

# Concrete Talking Points

BUILD WITH STRENGTH
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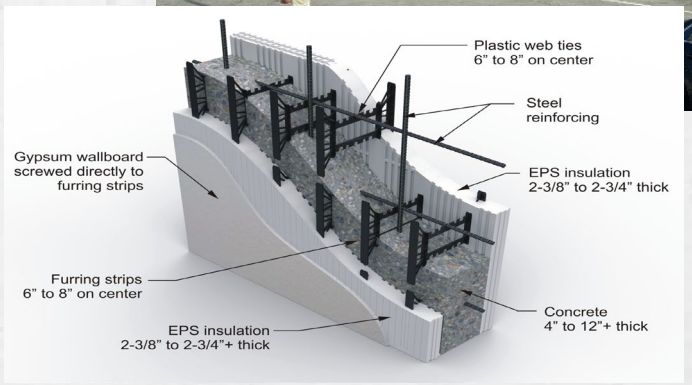
**Advantages for Load Bearing Mid-rise**

- Safer and Easier to Use
- Fewer Trades – Saves Money
- Flexible – Easily receives any finish and all building systems
- Quiet – Happy Owners Save you Money
- Energy Efficient – Saves Money
- Resilient and Non-Combustible
- Sustainable – USE-PHASE & EMBODIED CARBON is DRAMATICALLY REDUCED
- **Very Competitive on First Cost**
- **Fast – Saving Time Saves you Money**
- **Lower Insurance Costs – Saves Money**
- **A Higher Quality Asset with Lower Cost of Ownership**
- Well Established - 1000's of buildings nationally

# Case Study: 42 Broad, Fleetwood, New York

- 16-story mixed-use development
- Insulating Concrete Form (ICF)
- 16 stories is tallest ICF in the U.S. (several taller in Canada)



# High Performance Concrete

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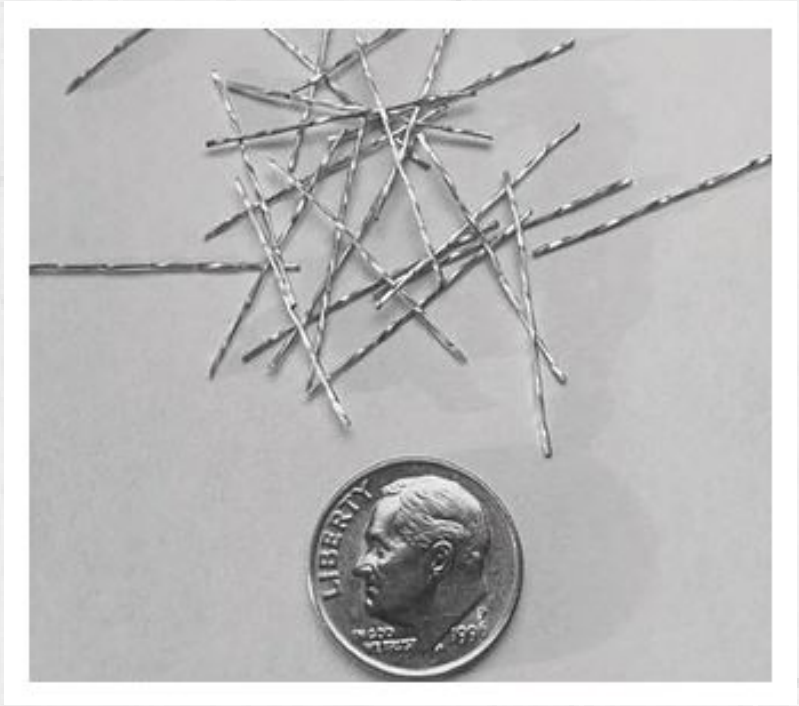


Off-Site Panelization

- Faster
- Steel Micro Rebar

# The State of the Art

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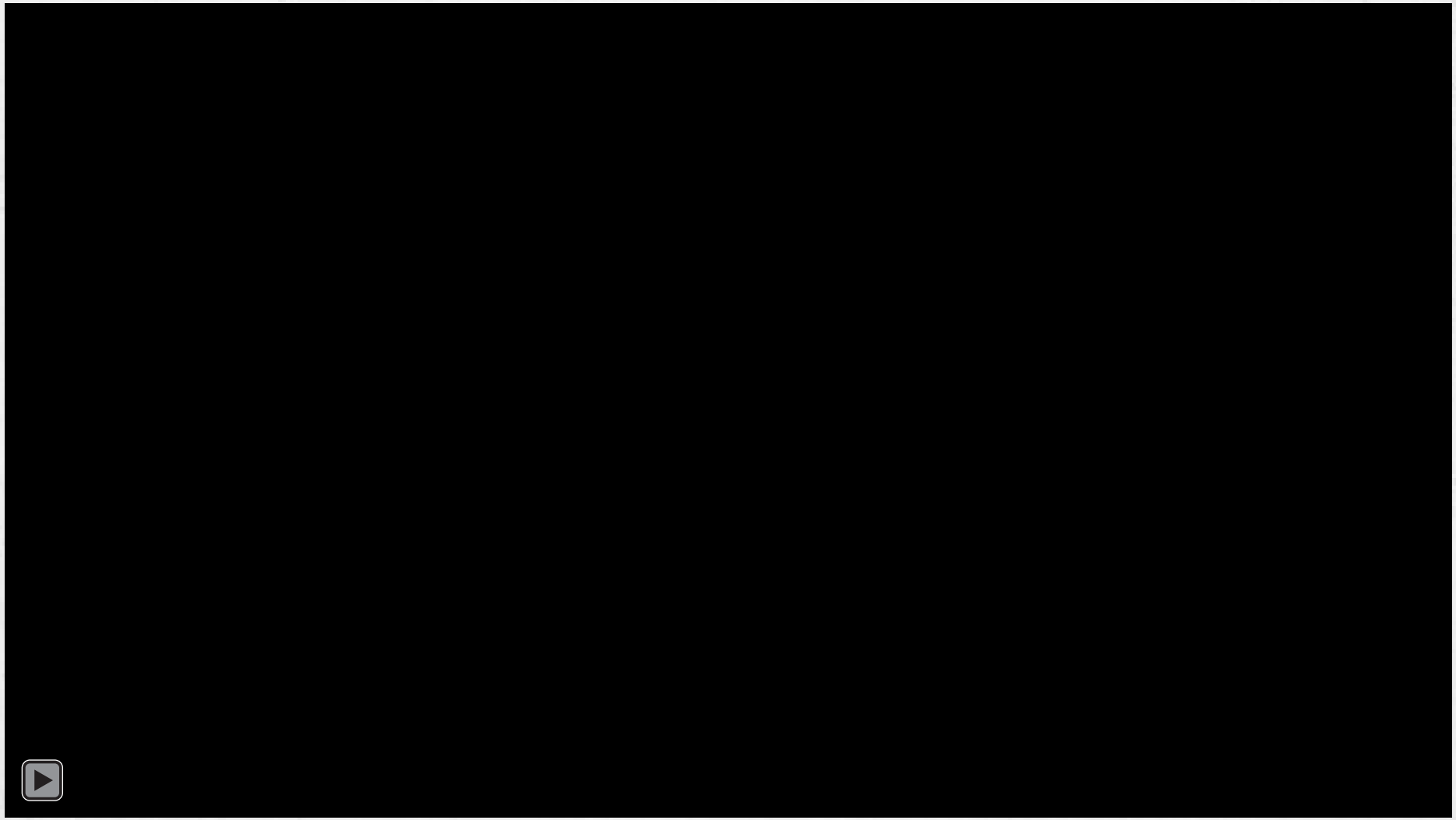

# The Numbers Work

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BEDFORD
DEVELOPMENT

Developing with Insulated Concrete Forms

# The Numbers Work

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## Wisconsin Multifamily

Total Square Foot of Wood Frame Construction = 176,444

Cost of Wood Framing including Exterior Insulation = $4,320,000 or $24.48 SqFt

Cost of Wood Framing MINUS Exterior Walls = $3,400,000 or $19.27 SqFt
Cost of Insulated Concrete Form Exterior Walls = $950,000 or $5.38 SqFt

Wood Frame Total: $4,320,000

ICF + Wood Frame Interior Total: $4,350,000

**PROs of ICF during Construction:**

1. **Ability to pour Stair Towers and Elevator Shafts concurrent with structure, also making both more sound proof**
2. **Eliminate exterior vapor barrier**
3. **Continuous R-22 or greater insulation with added bonus of concrete thermal mass**
4. **Can pour in winter conditions**
5. **Structural integrity of wall for various possibilities – hanging balconies, masonry tower or trash chute tie offs, skip hoist tie offs, etc.**
6. **Improves sound transfer through exterior wall**

# The Bottom Line

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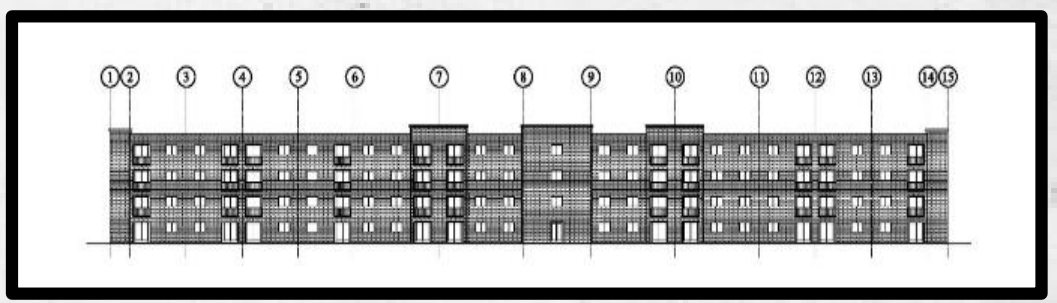
| Location | Wood Frame | Concrete | Difference for Concrete (%) |
|---|---|---|---|
| National Average | $15,119,749 | $15,240,802 | +0.8% |
| Los Angeles | $17,754,740 | $17,714,667 | -0.2% |
| San Francisco | $20,144,342 | $19,769,766 | -1.9% |
| Seattle | $16,509,115 | $16,690,173 | +1.0% |
| Denver | $14,130,432 | $14,509,158 | +2.7% |
| Miami* | $13,123,595 | $13,287,659 | +1.3% |
| Washington, DC | $14,581,052 | $15,156,134 | +3.9% |
| Newark, NJ | $18,484,393 | $17,898,134 | -3.3% |
| New York City* | $21,125,262 | $20,239,874 | -4.4% |
| Boston | $18,076,621 | $17,894,882 | -1.0% |
| Hartford, CT | $16,615,064 | $16,521,694 | -0.6% |



# Seeing is Believing

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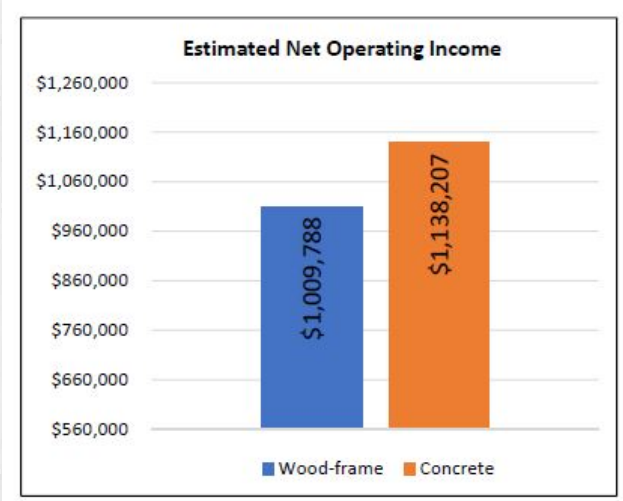
Microtel Inn & Suites by Wyndham Study

Prepared by Leigh Overland Architect, LLC
The Overland Design Group
for

NRMCA






"In speaking with the architect before, there are no Microtel projects that are ICF, he is a fan of the product but did not think the numbers would work for the Microtel Brand."

A preliminary cost estimate was conducted for Microtel in Gambrills, MD using Annapolis, MD costing data from RS Means. The building consists of 78 hotel rooms. The cost estimate was conducted for both combustible construction and non-combustible construction. Cost estimates were derived from RS Means, the most widely known and respected cost estimating data available.

The combustible construction consists of wood frame construction for all the walls, floors and roof of the building. The non-combustible construction consists of Insulating Concrete Walls (ICF) construction for the exterior, corridor, demising and fire walls and precast hollow core plank for the floors and roof framing. The following are the results of the cost estimate:

Wood Frame: **$7,116,764** Concrete: **$7,201,326**

# Reduce Risk

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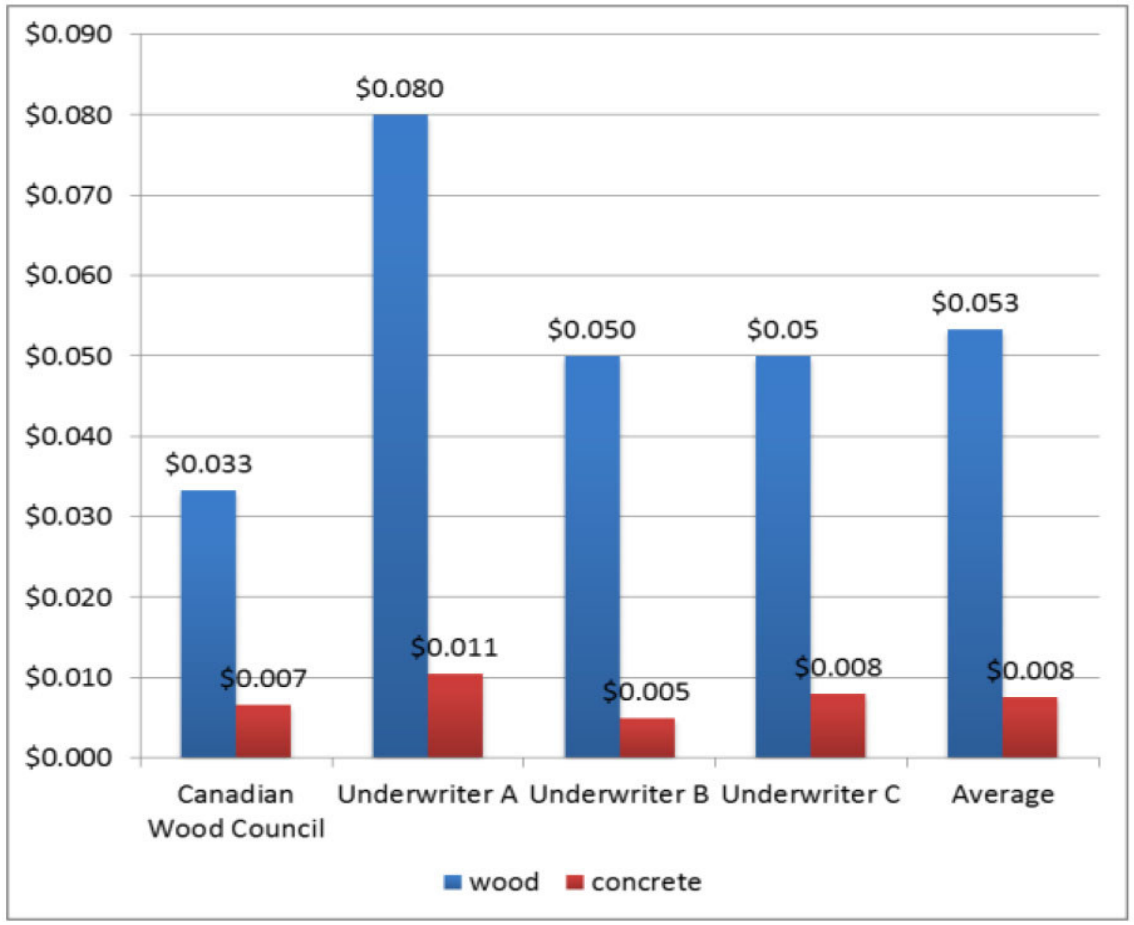
- Insurance costs more than six times greater for wood frame buildings than for concrete buildings - Globe Advisors

*Study of Insurance Cost for Midrise Wood Frame and Concrete Residential Buildings, 2015*

For developer Trammell Crow Residential, a project in a "hot spot" city where fires have happened could cost $400,000 to $450,000 to insure for a year, up from $150,000 to $200,000 in 2015, according to Scott Woodward, Trammell Crow's risk management and legal director in Dallas. Some insurance carriers are refusing to insure any housing projects in the wake of fires, Woodward said.

**Course of Construction, Builders Risk Insurance Rates per $100 Monthly**




Source: Data drawn from Confidential Interviews and Canadian Wood Council

# Concrete Talking Points

BUILD WITH STRENGTH
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## Advantages for Load Bearing Mid-rise

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- Very Competitive on First Cost
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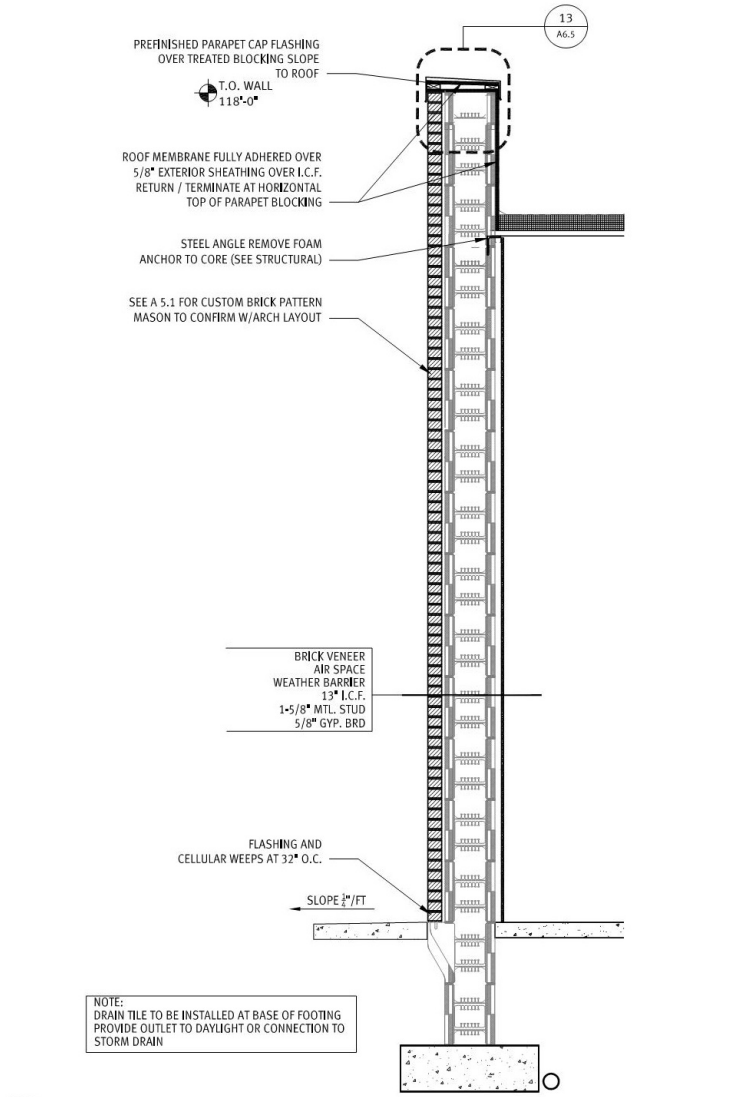
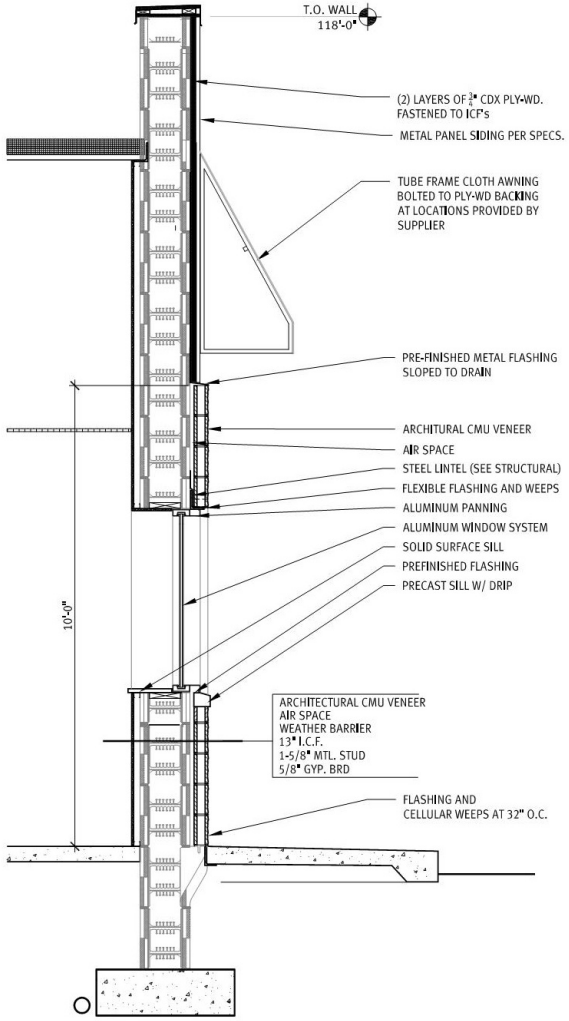
# Meskwaki Travel Plaza Tama, IA

# Meskwaki Travel Plaza Tama, IA




2 SECTION AT BRICK VENEER
1/2" = 1'-0"




3 SECTION AT NORTH WALL AT DIESEL ENTRY
1/2" = 1'-0"

# Meskwaki Travel Plaza Tama, IA

# Onigum Community Center Onigum, MN

# Onigum Community Center Onigum, MN

# Onigum Community Center Onigum, MN

# Onigum Community Center Onigum, MN

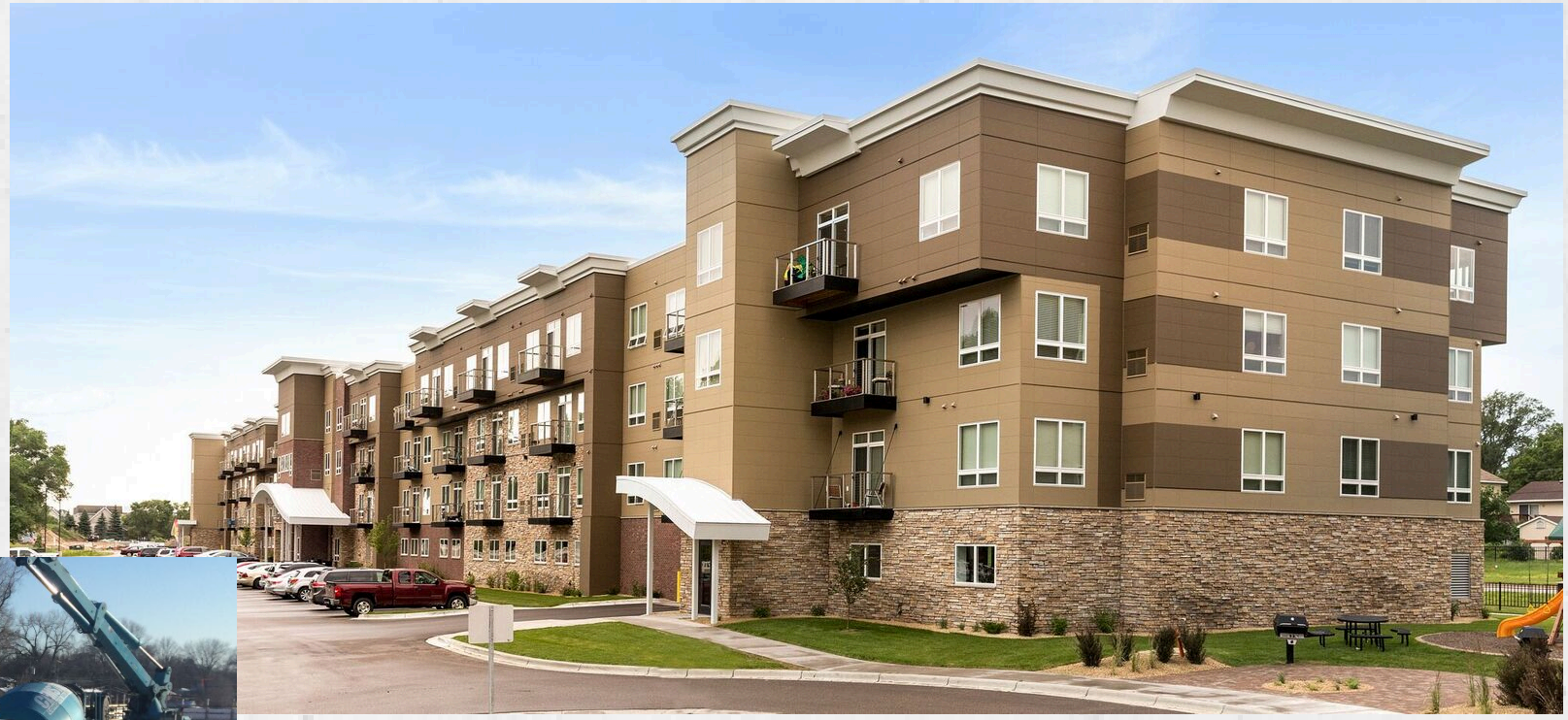

# Onigum Community Center Onigum, MN

# Onigum Community Center Onigum, MN

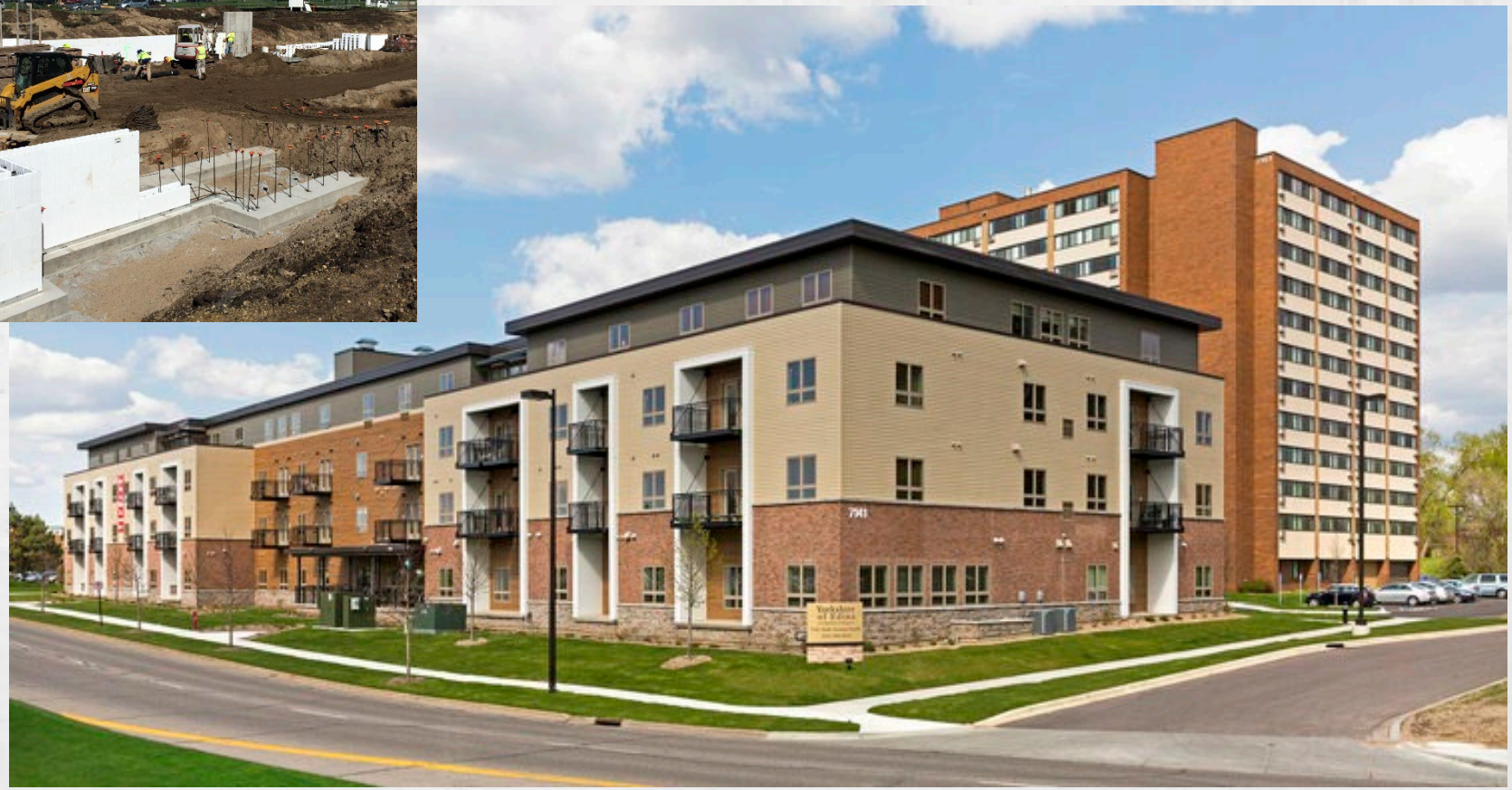
# Redhawk Estates New Town, ND

# Redhawk Estates New Town, ND

# Cielo Apartment Complex Fridley, MN



# Yorkshire Edina, MN



# Fire Station Dunseith, ND

# Fire Station Dunseith, ND

# Fire Station Dunseith, ND


# Annual Institute for Building Officials

## Questions?


**Let Us Help You Build With Strength!**

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dthompson@nrmca.org
224.627.3933

**Chad Regnier**
chadr@concreteincmn.com
320.241.5220

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# Free Design Assistance

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# Free to Use

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**Ronald McDonald House**
**Charleston, South Carolina**


Design Recommendations Prepared for

**LSP3 Associates**

**Prepared by:**
Lionel Lemay
llemay@nrmca.org
847-918-7101



## 1. Construction Cost Estimate

A cost estimates were conducted for the proposed new Ronald McDonald House in Charleston, SC using preliminary design drawings supplied by LS3P Associates. The building is 5 stories comprising 52 apartment units along with office space, common rooms, meeting rooms and tuck-under parking on the first level. The building includes slab on-grade construction on level 1 with 4 elevated floor slabs and a sloped truss-shaped roof. Although elevations and renderings were not provided, it appears that the building envelope is primarily solid wall with punched openings but with a significant portion being curtain wall. In addition, the programming on level 1 and 5 are significantly different which will require transfer structure at level 2 and level 5.

Based on these parameters, we evaluated 3 different structural systems:

1. Insulating Concrete Form (ICF) bearing walls (exterior, corridor and demising) supporting 1-way concrete slabs in the residential areas and concrete columns supporting 1-way concrete slabs in the non-residential areas.
2. Concrete Masonry Units (CMU) bearing walls (exterior, corridor and demising) supporting 1-way concrete slabs in the residential areas and concrete columns supporting 1-way concrete slabs in the non-residential areas.
3. Concrete frame with columns supporting 1-way concrete slabs for the entire building with steel stud walls for exterior, corridor and demising walls.

In all cases, we recommend using steel trusses supported on steel columns for the roof structure.

The following are the results of the cost estimate:

| Framing System | Cost Estimate |
|---|---|
| ICF Walls + Concrete Frame | $8,599,058 |
| CMU Walls + Concrete Frame | $8,910,948 |
| Concrete Frame + Steel Stud Walls | $8,524,088 |

The Concrete Frame + Steel Studs offer the lowest cost but ICF Walls + Concrete Frame is only $75,000 more. The ICF Wall option would offer other significant benefits including the shortest construction time, most energy savings (approximately 20%), lowest noise transmission between units and most comfortable experience for residents. The detailed cost estimates are provided in the appendix.

**Recommendation:**

**Use ICF Bearing Walls + Concrete Frame Construction**



## 4. Case Studies

There are hundreds of multifamily projects built using ICFs for walls in combination a concrete floor system. The following are a few examples. For more visit www.ConcreteTracker.org.

### Apartments and Condos

**17 South, Charleston, South Carolina**

*Image courtesy of EYC Companies*

This 220 unit, 249,00 square foot apartment complex in Charleston is the first multifamily project in the region constructed with Insulating Concrete Forms. Proximity to the coast and exposure to Atlantic hurricanes required durability and resilience. As a third generation wood framing contractor, the developer, EYC Companies, realized that concrete and ICFs would cost-effectively provide a more secure place for their tenants. Energy efficiency benefits would also save on utility costs and generate additional revenue once the project was completed and occupied. The first of several ICF projects in the Carolinas, 17 South takes advantage of the strength, energy performance, sound attenuation, and speed of construction which are typical of insulating concrete forms.

**Beach Green North, Rockaway, New York**

*Image courtesy of The Bluestone Organization*

This 101-unit, 94,000-square-foot apartment building is built in an area devastated by Hurricane Sandy in 2012. The Bluestone Organization selected ICFs for exterior, corridor and demising walls and precast hollow-core floors for disaster resilience and energy efficiency. The building is so energy efficient it is certified by the Passive House institute. ICFs create a solid concrete wall with continuous insulation, resulting in a comfortable and airtight structure that lowers energy bills. The reinforced concrete system results in a structure that's strong, durable and can stand up to fire, floods and wind. This developer builds exclusively with concrete.

# Project Statistics

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## Four Story, 53,311 sf Hotel

- 87 suites
  - 55 studio suites
  - 16 one-bedroom suites
  - 16 two-bedroom suites

# First Cost Estimate

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A COALITION OF THE NATIONAL READY MIXED CONCRETE ASSOCIATION

**Concrete construction is 3.2% greater than wood frame construction**

| Wood Frame Construction Cost | Concrete Construction Cost |
|---|---|
| $8,692,949 | $8,971,784 |

**$278,835 additional cost**

# Operating Cost Estimate

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**Operating income greater for concrete:**

- Estimated Energy Savings: 10%
- Property Insurance Savings: 37%
  - Source NRMCA Insurance Study
- Increased Occupancy: 5%
  - Noise reduction/Increased comfort

# Operating Income & Expenses

BUILD WITH STRENGTH
A COALITION OF THE NATIONAL READY MIXED CONCRETE ASSOCIATION

## Estimated Operating Expenses/Net Income:

- **$136,000 savings**
  - **Each year**
- **First cost payback:**
  - **24.6 months**

| | | Wood | Concrete |
|---|---|---|---|
| **Operating Expenses** | | | |
| Rooms | | 738717 | 738717 |
| Food and Beverage | | 0 | 0 |
| Other Operated Departments | | 28536 | 28536 |
| Administrative and General | | 236205 | 236205 |
| IT Systems | | 15399 | 15399 |
| Sales and Marketing | | 236205 | 236205 |
| Property Operation and Maintenance | | 124671 | 124671 |
| Utility Costs | 10% Estimated Energy Savings | 96918 | 87226 |
| Management Fee | | 101616 | 101616 |
| Rent | | 16878 | 16878 |
| Property Taxes | | 113622 | 113622 |
| Insurance | 37% Estimated Savings | 40890 | 25761 |
| Other | | 4524 | 4524 |
| **Total Operating Expenses** | | **1578267** | **1568575** |
| **Net Operating Income** | 13% additional annual income | **1015638** | **1151641** |

# Seeing is Believing

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# Training Contractors

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Annual Institute for Building Officials

# Advantages of Concrete for Low- and Mid-Rise Construction

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Senior Director, Building Innovations NRMCA
**Chad Regnier**
President Concrete, Inc.

BUILD WITH STRENGTH MINNESOTA

CI CONCRETE, INC.

**January 12, 2021**